WORLD

SYNTHETIC

JUNE, 1944

Newsletter No. 6
JUNE, 1944

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BARAK ACTIVATION OF THIAZOLES IN GR-S

BARAK is unique in its effect on GR-S stocks. While it is completely inactive when used by itself, even in large amounts, it is a strong activator for acidic accelerators. Barak is an excellent activator for 2-MT and for all of the thiazoles, but it appears to be of most value when used in conjunction with MBTS.

AMOUNT TO USE: To obtain the highest efficiency from the combination, it is desirable to use a relatively high ratio of Barak to MBTS. In a GR-S stock containing easy processing channel black, a combination of 0.5 to 0.75 part Barak with 0.75 to 0.5 part of MBTS is usually preferred. Not only does the use of Barak permit conservation of the thiazole primary accelerator but it also results in stocks having a flatter cure and vulcanizates having both a high degree of resistance to crack growth and to deterioration on heat aging.

OUTSTANDING PROPERTIES: Chemically, Barak is dibutyl ammonium oleate. Being a non-accelerator of vulcanization, Barak is inherently non-persistent in GR-S. Its relatively strong activating effect on MBTS permits maintenance of a fast rate of cure in the presence of relatively small amounts of the thiazole accelerator as is shown in Figure I. The faster rate and higher state of cure obtained by Barak activation are indicated by the higher modulus and the smaller change in all properties with extended cure. The decrease in heat build-up further substantiates this fact.

A consistent improvement in properties after aging at 100° C. is obtained by increasing the ratio of Barak to MBTS. The effect of Barak on resistance to crack growth after aging is outstanding. While the stock accelerated with straight MBTS cracked the full one-inch width in 2 hours when flexed at 70° C., the substitution of Barak for increasingly large amounts of the MBTS caused a proportional reduction in crack growth. As shown, the substitution of MBTS 0.5–Barak 0.75 for MBTS 1.25 parts reduced crack growth by 40 per cent.

AVAILABILITY: Barak is made from currently non-critical raw materials. Manufacturing capacity is relatively large and it can, therefore, be supplied in quantities to meet your requirements. Consult the du Pont Technical Representative or write the Rubber Laboratory for further information or help on your specific problem.

FIGURE I

THE EFFECT OF BARAK ACTIVATION OF MBTS IN A GR-S STOCK

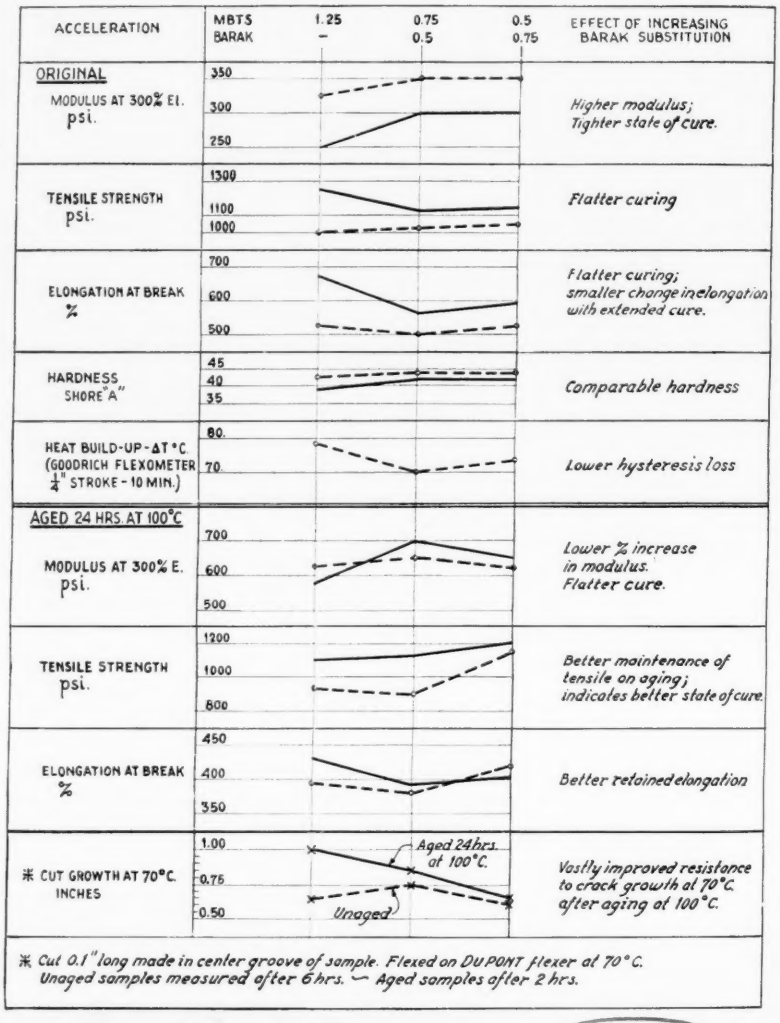
Base Compound

GR-S	100.
Sulfur	2.
E.P.C. Black	20.
Softener	8.
Zinc Oxide	3.
Accelerator	As indicated

KEY — cure

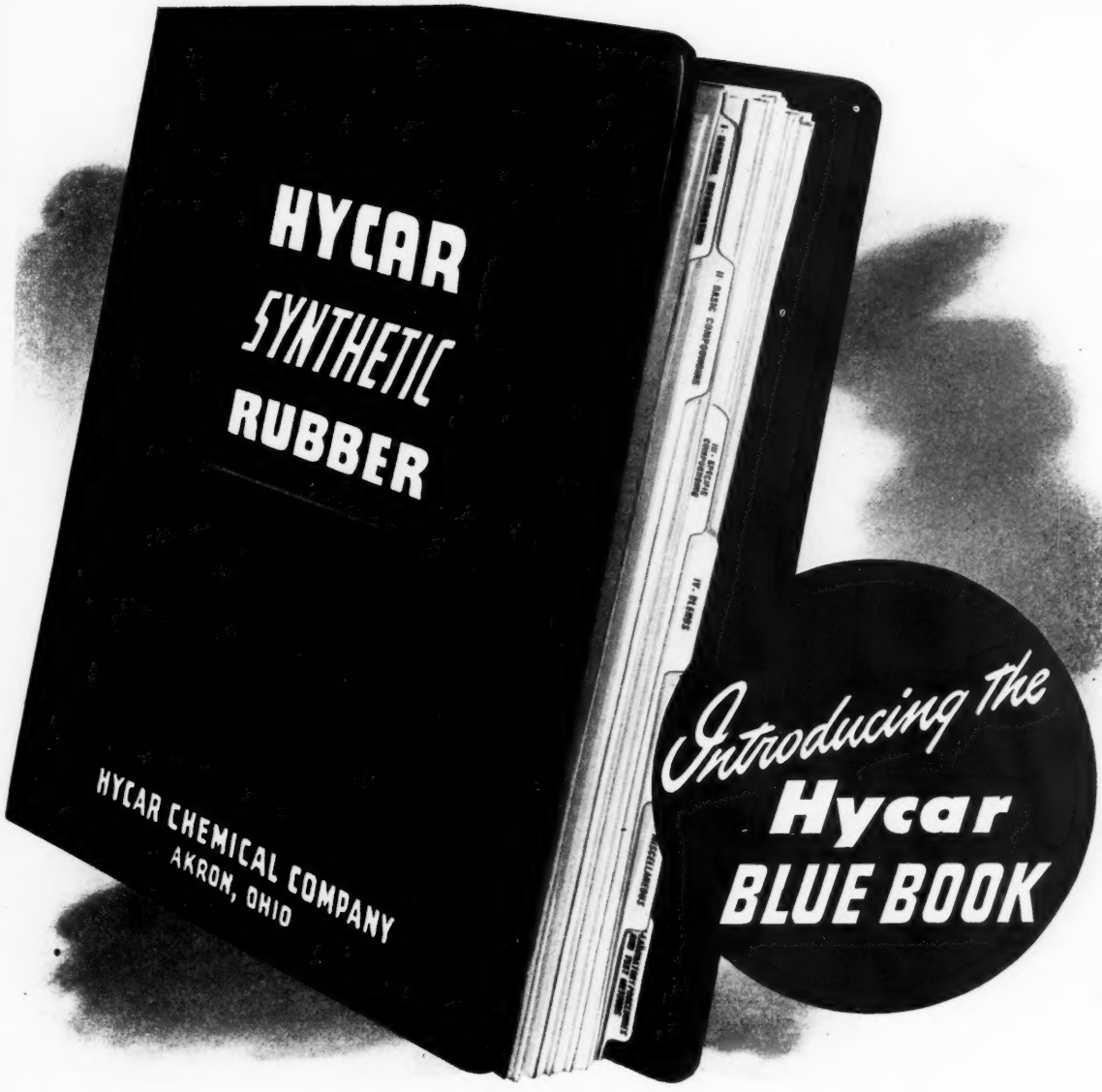
——— 60 min. at 280° F.

— — — 90 min. at 280° F.



* Cut 0.1" long made in center groove of sample. Flexed on DU PONT flexer at 70° C. Unaged samples measured after 6 hrs. — Aged samples after 2 hrs.

INDIA RUBBER WORLD, June, 1944, Vol. 110, No. 3. Published monthly by BILL BROTHERS PUBLISHING CORP., 1309 Noble Street, Philadelphia 23, Pa. Editorial and advertising offices, 386 Fourth Avenue, New York 16, N. Y., U. S. A. Entered as second-class matter October 5, 1889, at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. Subscription, United States and Mexico, $3.00 per year; all other countries, $4.00; single copies, 35 cents.



COPIES of the new, loose-leaf Hycar Blue Book, covering the compounding and processing of Hycar synthetic rubber, have been distributed as widely as possible to interested executives. Through this book, we hope to keep the industry informed of the latest developments in Hycar processing. With this thought in mind, the various sections and groupings have been arranged to facilitate inserting additional or superseding material.

While material shortages have limited the supply of loose-leaf binders for this Blue Book, complete sets of the text, without binders, can still be supplied. It will be necessary to restrict their distribution to Rubber Companies, Rubber Consultants, Offices and Laboratories of Suppliers to the Rubber Industry, and specific Rubber Laboratories of Educational and Research Institutions.

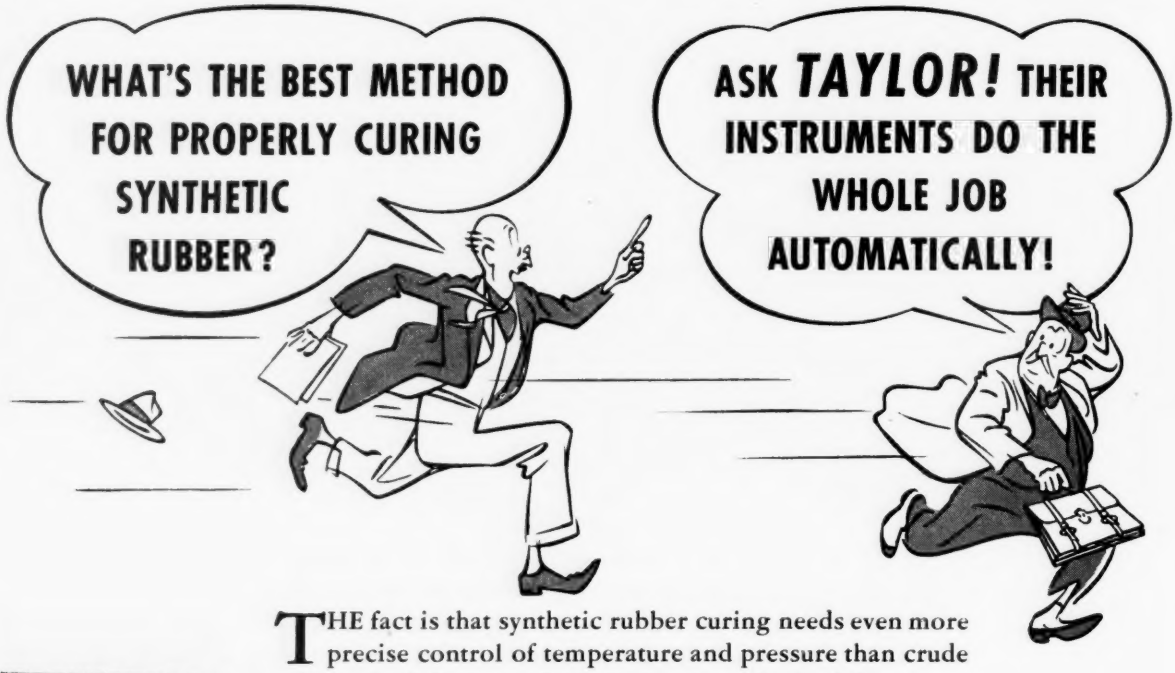
We will do our best to fulfill all requests for the Hycar Blue Book to take care of your actual requirements. *Hycar Chemical Company, Akron 8, Ohio.*

Hycar

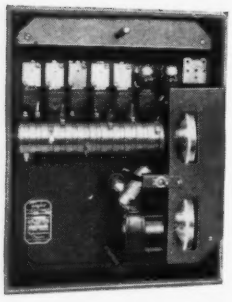
Reg. U. S. Pat. Off.

LARGEST PRIVATE PRODUCER OF BUTADIENE TYPE

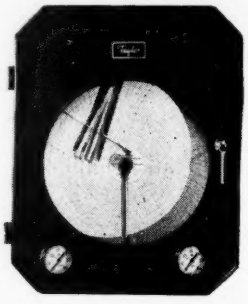
Synthetic Rubber



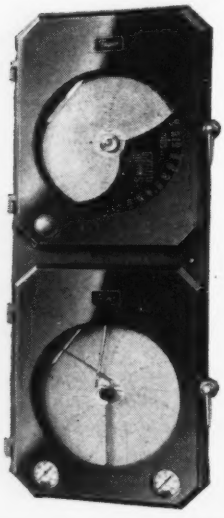
THE fact is that synthetic rubber curing needs even more precise control of temperature and pressure than crude rubber. And these are the instruments to do the job:



1 THE TAYLOR FLEX-O-TIMER. On platen presses, tire presses, and the more complicated vulcanizer installations, the Taylor Flex-O-Timer automatically controls the sequence and duration of all functions. All you do is load the presses and push the button!



2 FULSCOPE RECORDING TEMPERATURE CONTROLLER. Supplies automatic control for vulcanizers, platen presses, or tire presses. On the new McNeil Steam Dome Tire Press, for example, it accurately controls press temperature and condensate removal.



3 THE FULSCOPE TIME-SCHEDULE CONTROLLER. A "mechanical brain" wherever predetermined time-temperature or time-pressure schedules, or combinations of both, are required.

Ask your Taylor Field Engineer for full details. Taylor Instrument Companies, Rochester, N. Y. and Toronto, Canada. *Instruments for indicating, recording, and controlling temperature, pressure, humidity, flow, and liquid level.*

ARMY E NAVY

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MEAN

ACCURACY FIRST

IN HOME AND INDUSTRY

BUY AN EXTRA WAR BOND TODAY!

RELIEF IN SIGHT!

Is your tubing production "tied up" because of tough, nervy GR-S?
There is a proven remedy... NAFTOLEN!

NAFTOLEN swells the GR-S, thus providing a smooth-processing stock.

Take the GR-R-R-R out of GR-S; use NAFTOLEN, the product that gives

Smoothness

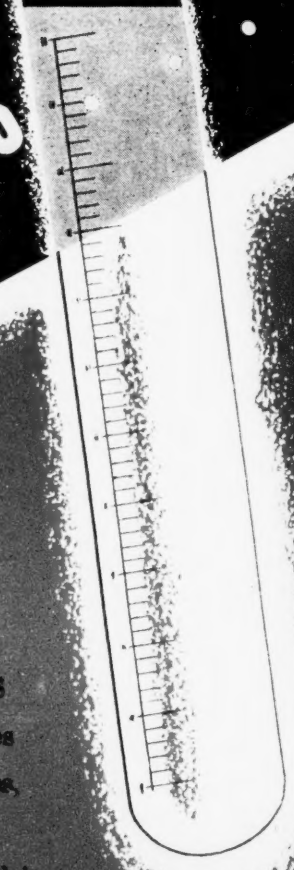
WILMINGTON CHEMICAL CORPORATION

10 East 40th Street, New York 16, N. Y.

"NAFTOLEN" Reg. U. S. Pat. Office

A NEW SELF-ACTIVATING ACCELERATOR FOR GR-S

AERO AC 165*



Aero AC 165 is a new accelerator that brings much-sought properties to GR-S formulations. Aero AC 165 disperses readily, and has low scorching tendencies, and other safe processing qualities.

With Aero AC 165 only one material is required for the accelerating action. Aero AC 165 produces vulcanizates with good physical properties, including better cut growth resistance and improved aging characteristics.

The advantages of Aero AC 165 over the usual straight thiazole or D. P. G. activated thiazole are reported in technical detail in a new Cyanamid book of timely interest to GR-S compounders. May we send you a copy?

AMERICAN CYANAMID
& CHEMICAL CORPORATION
(A Unit of American Cyanamid Company)
30 ROCKEFELLER PLAZA · NEW YORK 20, N. Y.

A WELL-ROUNDED SERVICE TO THE RUBBER INDUSTRY

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AERO AC 50**

AERO BRAND DOTG

AERO BRAND DPG

AERO* BRAND ACRYLONITRILE

AERO BRAND RUBBER SULPHUR

K & M MAGNESIUM OXIDE

K & M MAGNESIUM CARBONATE

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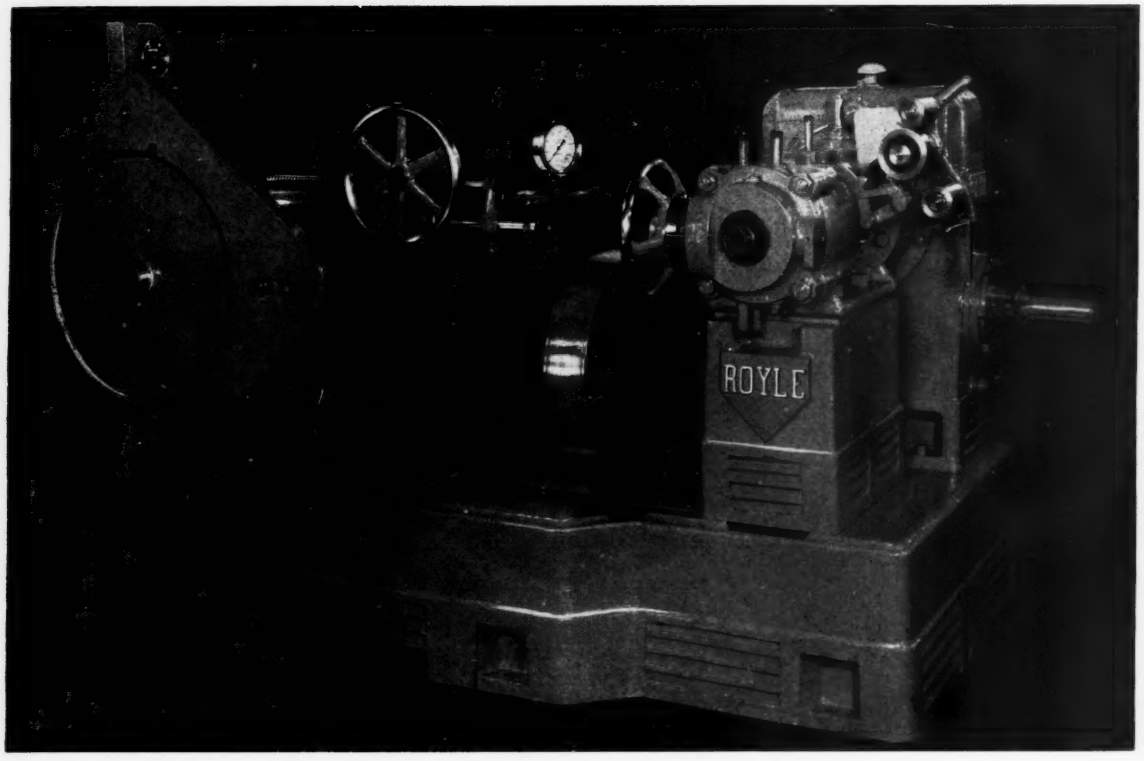

No. 2 Royle Continuous Vulcanizing Insulator

64 years of progressive pioneering . . . . . .

A lot of water has flowed over the dam since the first Royle Extruder was introduced sixty-four years ago. In 1880—and during the following decade—an impenetrable veil of secrecy existed. No extruder had ever been seen in operation nor had any report on production achievements ever been received.

That veil of secrecy is gone. In its place has come a spirit of wholesome cooperation. This cooperation makes it possible to design Royle Extrusion Machines to meet the specific requirements of the application involved. As always cooperation produces maximum results.

Today, Royle production is devoted to the requirements of the Armed Forces. New applications of extrusion processes are being developed. These new processes hold promise of new and better products when Victory has been won.

JOHN ROYLE & SONS

ROYLE PATERSON N. J.

PIONEER BUILDERS OF EXTRUSION MACHINES SINCE 1880

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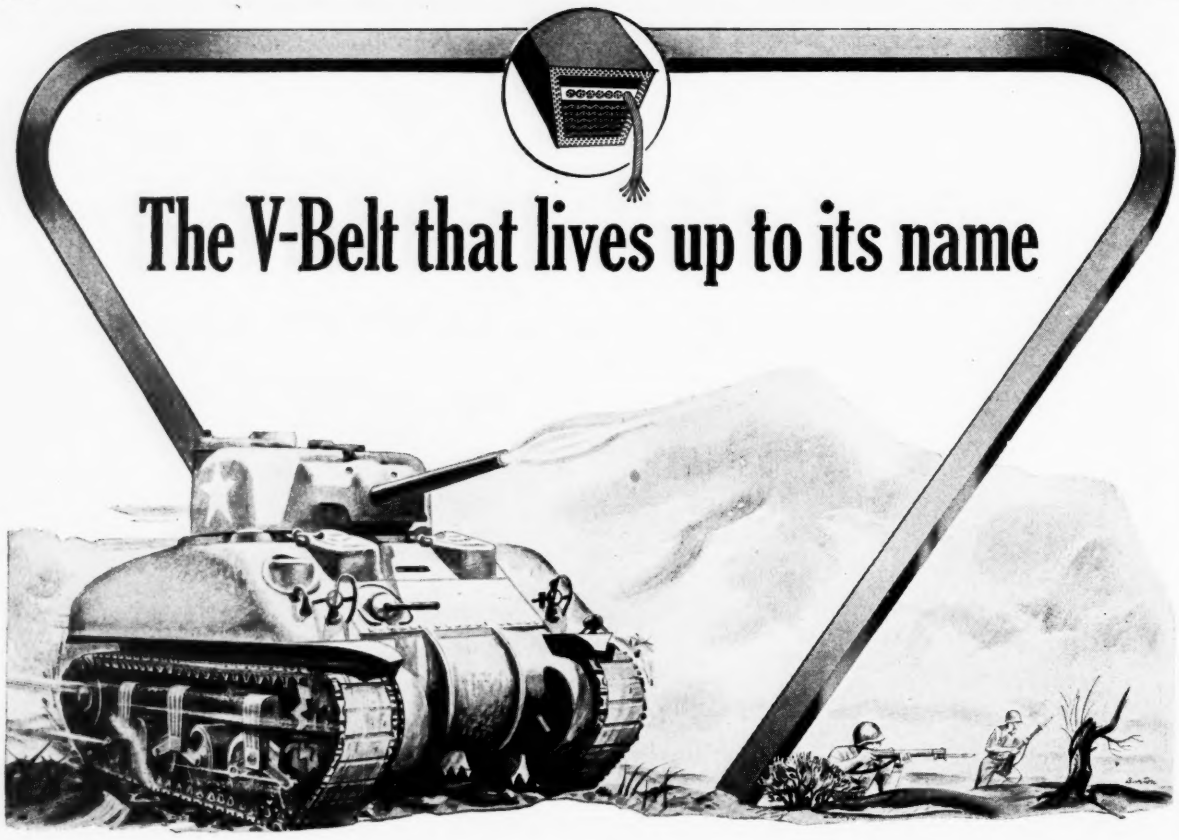
UNiversity 3726

PATERSON 3, NEW JERSEY



The V-Belt that lives up to its name

THERE'S a new reason for calling them . . . V-belts. For the "V" now symbolizes victory over the chief causes of ordinary V-belt failures that at one time gave Army engineers many a headache.

These new type V-belts have to meet severe service driving the generators, fans, fuel and water pumps in armored tanks. Ordinary fan belts with cotton cords couldn't stand up under the high temperatures generated by high-powered tank engines. The extreme heat caused cotton cords to stretch, engines overheated—often resulted in stalling—and the higher the heat, the shorter the life of the belt.

To meet Army requirements that V-belts should perform satisfactorily for the life of the engine, various types and construction of reinforcing cable were tried. But none proved entirely satisfactory until National-Standard's engineers, long experienced in developing and combining fine wire with rubber, licked the problem. The wire had to be suitable for stranding with high uniformity—any twist would tend to make the belt twist . . . providing maximum adhesion to rubber was highly essential.

How well National-Standard helped leading V-belt manufacturers meet Army specifications is evidenced by the additional use of these belts for many trucks and gun carriers.

Similar type V-belts are used for power transmission drives — longer life—accurate and more permanent fit permits the use of fewer belts per driving unit. Wire reinforcement has eliminated excessive stretching in conveyor belts too, made possible heavier loading, longer life and great economy.

This is typical of National-Standard's service to all industry—perhaps this research and engineering skill can be utilized to improve your products. Why not write and find out?

NATIONAL STANDARD Company

BACK THE ATTACK • BUY MORE WAR BONDS

Divisions of National-Standard Company

NATIONAL-STANDARD
Niles, Mich.
TIRE WIRE, FABRICATED BRAIDS AND TAPE

ATHENIA STEEL
Clifton, N. J.
COLD ROLLED, HIGH-CARBON SPRING STEEL

WAGNER LITHO MACHINERY
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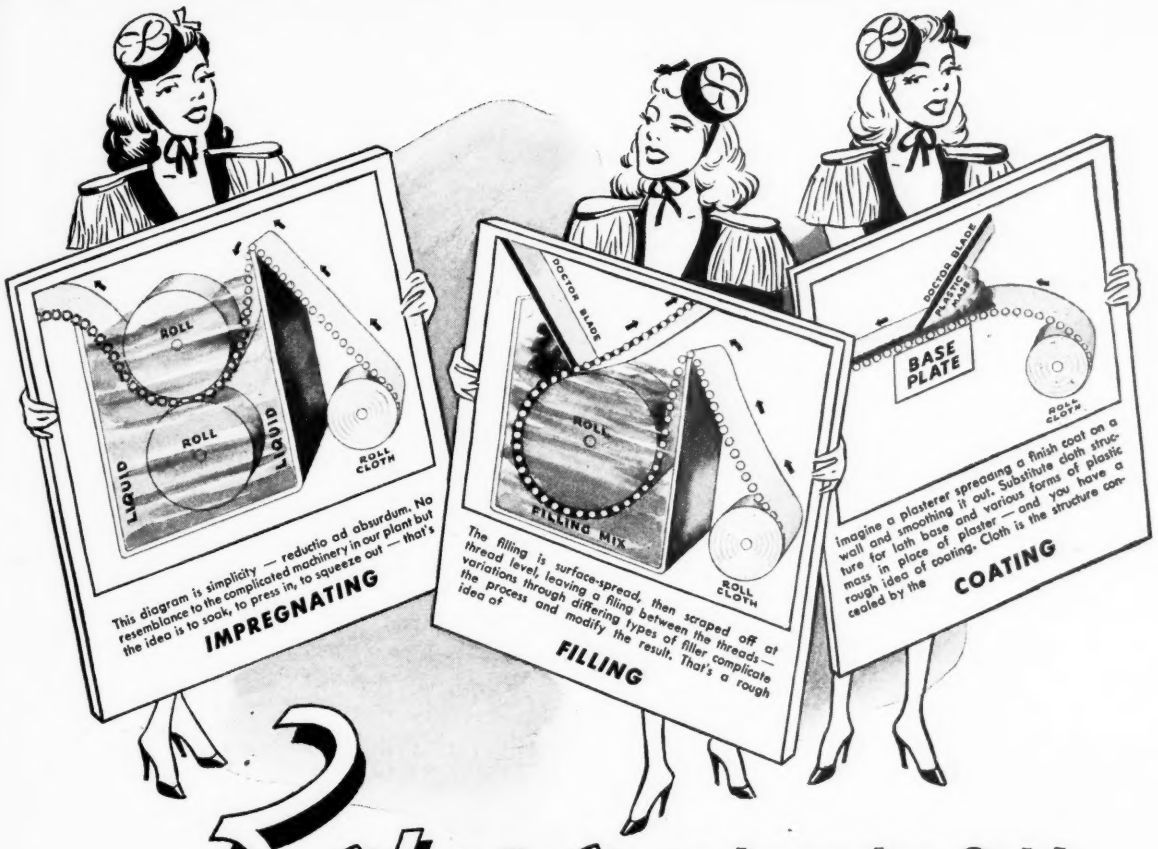
LITHOGRAPHING AND SPECIAL MACHINERY

WORCESTER WIRE WORKS
Worcester, Mass.
ROUND STEEL WIRE, SMALL SIZES



3 steps to broader fields of usefulness

For many of the established uses of cloth find, if you can, an adequate substitute. There is none because only a woven fabric drapes, folds, creases, holds stitching or adhesives and conforms to contour with a comparable degree of elastic tensile strength. Cloth is a structure distinctive in nature and when processed to special use, serves that use as can nothing else. Processing to purpose brings woven cloth in the forefront of postwar production materials.

COATING

Coating means using the woven fabric as a structural base and covering and concealing the texture with a heavy bodied flexible substance spread on much as plaster is spread on lath. Coating materials are varied to secure differing appearances and properties. Many of these coatings fall in the plastic group. New coating treatments are being devised and greatly varied properties secured. Coating may be preceded by impregnating or filling.

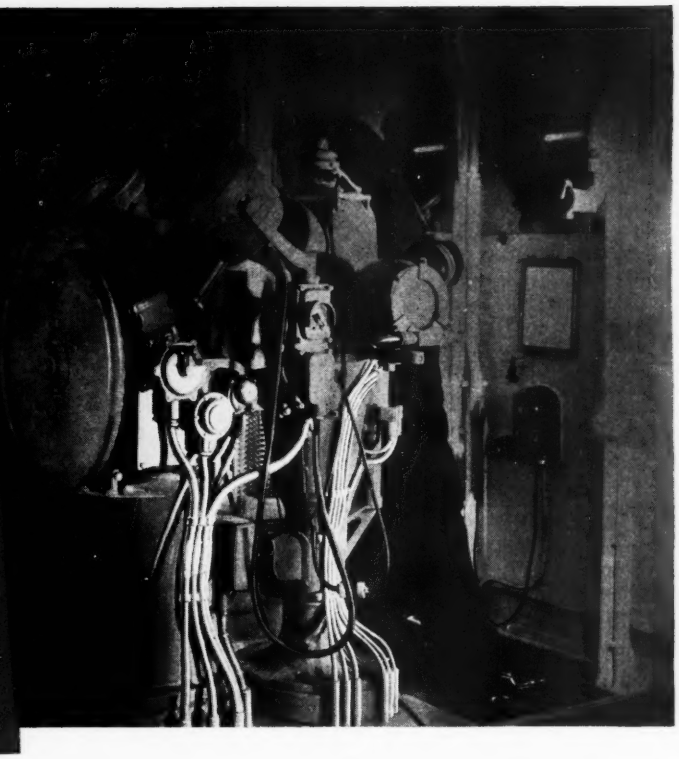
CURRENT HOLLISTON PRODUCTION includes COATED AND IMPREGNATED FABRICS . . . INSULATING CLOTH BASE . . . SEPARATOR CLOTHS rubber, starch-filled, glazed. TRACING AND BLUE PRINT CLOTHS white and blue, ink or pencil. MAP CLOTH, PHOTO CLOTH, self-adhesive. REINFORCING FABRICS. SIGN, LABEL AND TAG CLOTHS, waterproof to take any ink, meet any inking problem. BOOK-BINDING CLOTHS. SHADE CLOTH, impregnated waterproof, opaque, translucent or light proof.

We urge you to consider CLOTH; and invite you to consult with us concerning possibilities and developments for your specific requirements.

The Holliston Mills, Inc.
PROCESSORS OF CLOTHS FOR SPECIAL PURPOSES
NORWOOD, MASSACHUSETTS
Sales Agents in Principal Cities

Sea-going electrical cables stay in the fight . . . aided by a radically new type of plasticizer

PARAPLEX G-25



THE ability of a battleship crew to fight as a coordinated team depends upon the miles of cables that carry messages, power and light to every battle station aboard ship. Extremes of heat and cold, moisture, gasoline and oil are enemies of this nerve system, constantly attacking the insulation on the cables and impairing their efficiency.

Keeping cables tough, yet permanently flexible, from the Arctic to the Equator is a job for PARAPLEX G-25, a new synthetic resin and the *first* to combine all of the specialized plasticizing needs for electrical shipboard cables.

PARAPLEX G-25 is an outstanding plasticizer for polyvinyl chloride, the vinyl copolymers and Buna N type synthetic rubbers. Aircraft gaskets, caulking and sealing compounds, coatings for fabrics and food packaging, can linings...all can be improved with PARAPLEX G-25.

If you have a problem in which the outstanding properties, listed in the accompanying box, are vital, write today for details and testing samples of PARAPLEX G-25.

3 awards to The Resinous Products & Chemical Company and its associated firms, Rohm & Haas Company and Charles Lennig & Company.

Advantages of Compounds Plasticized with PARAPLEX G-25

1. Resistance to oils, gasoline and water
2. Heat stability and low volatility
3. No plasticizer migration
4. Low flammability
5. Good low temperature flexibility
6. Excellent resistance to ultraviolet
7. Very low heat deformation
8. Good electrical properties
9. Ease of extruding and calendering

PARAPLEX *is a trade-mark, Reg. U. S. Pat. Off.*

Represented by Cia. Rohm y Haas, S. R. L., Carlos Pellegrini 331, Buenos Aires, Argentina, and agents in principal South American cities.

THE RESINOUS PRODUCTS & CHEMICAL COMPANY

WASHINGTON SQUARE, PHILADELPHIA, PA.

TRADE MARK

THE NEEDS OF INDUSTRY

As industry approaches the peace it becomes apparent that chemistry must be a working partner of conversion. New problems, new products, new techniques . . . all demand its helping hand.

Chemical coatings are doing more than meet the peace-time needs of industry. They are creating industry . . . moulding industry . . . changing the entire course of production. In test tubes fired by war, thousands of new products, new processes and new profits have been born.

Chemical research in the coating field is helping to win the war . . . is laying the foundation for a post-war prosperity of tremendous proportions. How this research affects your business should be investigated carefully in your program of post-war planning. Your inquiry will incur no obligation.

Address The Stanley Chemical Company . . . manufacturers of Stanley lacquers, synthetics, enamels and japans . . . East Berlin, Connecticut.

Stanley Chemical


NET WEIGHT 25 LBS.
DIXIE 20
UNITED CARBON COMPANY Inc.
DIXIE 20
DUSTLESS - CARBON BLACK
U.S.A.
DIXIE 20
MADE IN U.S.A.
PATENTS APPLIED FOR

DIXIE 20

DIXIE 20 is a semi-reinforcing (SRF) type carbon black made by United's special furnace process.

IDEAL for the GR-S and other rubbers used in military and civilian goods.

OUTSTANDING for ease of processing, good plasticity, fast rate of cure, high resiliency, and low heat build-up.

WELL-KNOWN for uniform quality and performance.

RECOMMENDED for blending with channel black for moderate reinforcement and low heat build-up.

DIXIE 20 is a Strong Rubber Favorite.

RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

Charleston, West Virginia

Look out for one-way streets!

Exclusive Crown Zipper tooth design makes the Crown zipper track a two-way "street"—sliders work quickly, smoothly, almost effortlessly, in both directions!

Things began to happen fast when Crown Zipper engineers went out into the field with our armed forces to adapt zippers to special military jobs.

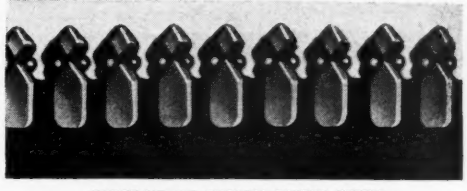
Out of Crown's experience have come five big basic advancements over old-style, conventional zippers (see list below)—and one of the most important of these is the superior construction of Crown Zipper teeth.

If you examine a Crown Zipper closely, you see that both sides of each tooth are identical. This permits sliders to operate smoothly, quickly, almost effortlessly, in either direction along the zipper track.

In addition, this exclusive Crown Zipper tooth design permits two or more sliders on the *same* track—making Crown the only zipper in the world that provides quick, convenient openings at any given point, with smooth closures in *both* directions. (One recent Crown application actually has ten sliders!)

After the war, Crown's new "double-acting" zippers will mean big improvements in rubber applications—on boots, raincoats and many other items.

When *you* turn to postwar, Crown engineers, fresh from their experience in designing hundreds of military items, will adapt—or, if necessary, *create*—special zipper applications to meet special problems.



CLOSE-UP OF CROWN ZIPPER TEETH REVEALS BOTH SIDES OF EACH TOOTH IDENTICAL

CROWN

ZIPPERS

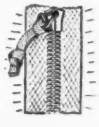
are 5 ways better

1. Takes sharp curves

2. Die-cast for smoother action—extra strength

3. Provides opening wherever you want it

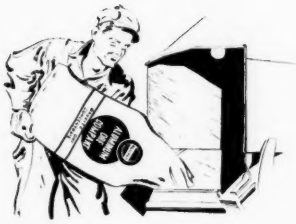
4. Won't lock open



5. Resists corrosion

Member of the J. & P. Coats • Clark's ONT *Family*

THE SPOOL COTTON COMPANY • *745 Fifth Avenue, New York, N. Y. (Crown Fastener Division)*



C-741 *Alumina*

makes an excellent rubber reinforcing pigment

Hydrated Alumina, C-741, being added to a batch of rubber stock

Uniformly fine in particle size—1/10 to 6/10 micron—C-741 Alorco Hydrated Alumina gives the rubber compounder a superior reinforcing pigment. He is able to produce a similarly uniform, high-quality, finished rubber product.

These are the very desirable properties obtained: The rubber has unusually high resistance to hot and cold tear, high strength at elevated temperatures, good resistance to abrasion, high modulus with high elasticity, and high resilience and rubbery properties with high pigment loading. It has low specific gravity and good dielectric properties.

The rubber maker finds C-741 Hydrated Alumina equally helpful in expediting his production: He gets high modulus in the uncured compound and unusually good tackiness of the uncured stock. For many rubber products, higher pigment loadings are possible. Crude rubber is conserved, while retaining physical qualities required by Federal specifications.

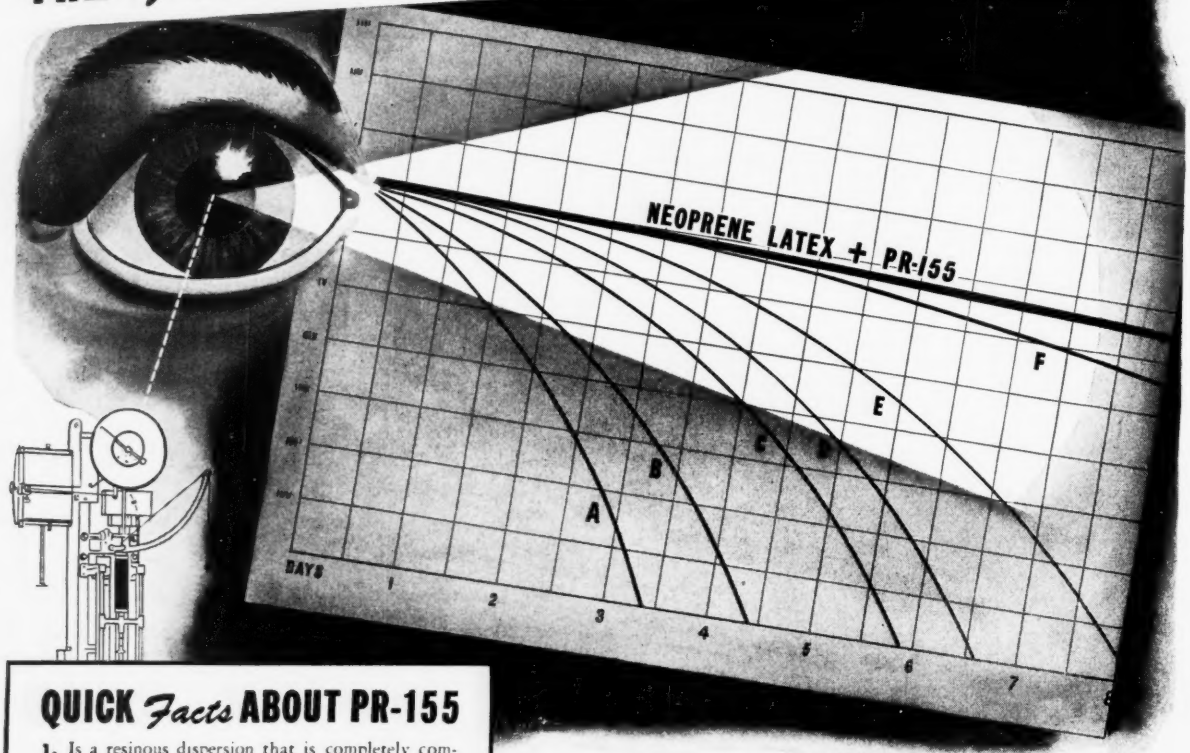
Rubber compounders making products for the war effort should investigate the use of C-741 Alorco Hydrated Alumina as a reinforcing pigment. ALUMINUM COMPANY OF AMERICA (*Sales Agent for* ALUMINUM ORE COMPANY), 1909 Gulf Bldg., Pittsburgh 19, Pa.

ALUMINUM ORE COMPANY

ALORCO

Aluminum and Fluorine Compounds

THE *Facts* ABOUT COMPOUNDING NEOPRENE LATEX



QUICK *Facts* ABOUT PR-155

1. Is a resinous dispersion that is completely compatible with Neoprene latex — blends with it intimately.
2. Produces Neoprene latex adhesives suitable for almost all former natural latex uses and possessing all the added advantages of oil resistance, etc. characteristic of Neoprene.
3. **Provides Neoprene latex adhesives which have pressure-sensitivity (dry tack) from a few hours up to 4 or 5 days, as desired.**
4. Contains necessary anti-oxidants and protective agents to insure proper ageing of the compounded adhesives.
5. Enables extension of Neoprene latex at substantial over-all savings. (Due to the unusually high strength of Neoprene, greater extension is possible in proportion to true rubber-like characteristics desired.)
6. Can be compounded with Neoprene latex in your own equipment, or UBS will compound and ship the desired finished adhesive to you.

Field Tests show UBS formulation PR-155 to be a most satisfactory Neoprene Latex Compound Base . . .

As the above graph illustrates, many dispersions, when compounded with Neoprene Latex, show definitely unsatisfactory ageing qualities. That's why users are so pleased with the bonding strength and lack of deterioration actual field tests show that PR-155 provides. The result of many years of practical experience compounding Neoprene, PR-155 is an original development of the UBS Laboratories. Write today for further information. Address your inquiries to the Union Bay State Chemical Company, Rubber Chemicals Division, 50 Harvard Street, Cambridge 42, Massachusetts.

For masking the basic odor of Neoprene Latex, we suggest using UBS Masking Perfume — Formula D6.

UBS

UNION BAY STATE
Chemical Company

Serving Industry with Creative Chemistry

ORGANIC CHEMICALS · SYNTHETIC LATEX · SYNTHETIC RUBBER
PLASTICS · INDUSTRIAL ADHESIVES · DISPERSIONS
COATING COMPOUNDS · IMPREGNATING MATERIALS · COMBINING CEMENTS

Uniformity, that most sought-after feature in industrial fabrics, is perhaps the most difficult to attain. It is not achieved through any one textile operation, but begins with the careful selection of top grades of cotton and must be controlled through every phase of fabric manufacturing. That is the reason for the broad system of laboratory control which guides every step in the production of MT. VERNON fabrics. The application of this modern method of quality control, plus the skill of more than fifty years industrial fabric-making experience, is your guarantee of a measure of uniformity in MT. VERNON fabrics which will meet your every specification.

MT. VERNON WOODBERRY MILLS, INC.

TURNER HALSEY COMPANY

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REPORT— FROM THE PROVING GROUND

Inspection of white side-walls of tires made prior to the embargo and which still are rolling on the highways reveals notable facts.

After more than two years of exposure the side-wall whiteness and brightness still are strikingly evident.

After more than two years of use the side-walls indicate an absence of cracking or checking.

Titanium pigments, of which TITANOX pigments are the oldest and most widely used, helped produce these desirable qualities—a fact worth remembering when white side-walls again are permissible.

Meanwhile it can be said that just as TITANOX pigments have the greatest whitening effect on natural rubber, so also do they have on GRS and reclaim.

TITANOX
REG. U.S. PAT. OFF.

TITANOX
REG. U.S. PAT. OFF.

TITANIUM PIGMENT CORPORATION
SOLE SALES AGENT
111 Broadway, New York 6, N. Y.
104 South Michigan Avenue, Chicago 3, Ill. • 350 Townsend Street, San Francisco 7, Calif. • 2472 Enterprise Street, Los Angeles 21, Calif.

For *Flex Crack* Resistance in GR-S...

WITCO M.R.

(HYDROCARBON)

WITCO M. R. IN TYPICAL TIRE TREAD STOCK FORMULA

Parts by Weight	#1	#2	#3	#4	#5
GR-S	100.	100.	100.	100.	100
Zinc Oxide	5.	5.	5.	5.	5.
Stearite	2.	2.	2.	2.	2.
Mercaptobenzothiazole	1.5	1.5	1.5	1.5	1.5
Sulfur	2.	2.	2.	2.	2.
Witco #12 Channel Black	50.	50.	50.	50.	50.
Witco #38 M. R.	0.	10.	20.	30.	40.
Width of Crack after 19,000 Flexing Cycles (in centimeters)	2 3	1.1	0.67	0.42	0.34

In tests conducted at Witco's research laboratory the effect of various amounts of Witco M.R. added to typical GR-S tire tread stock formulas revealed after the samples were subjected to 19,000 flexing cycles that the width of the resulting cracks decreased from 2.3 centimeters to .34 centimeters as additional amounts of Witco M.R. were used. The table above shows the actual report of these tests.

Additional Advantages Revealed

The addition of Witco M.R. not only definitely increases flex crack resistance in GR-S, but it also makes the uncured stock more plastic and easier to process...increasing tensile strength and tear resistance...while decreasing the effect of aging on lowering tensile strength. Witco M.R. also lowers elongation and hardens the uncured stock, while decreasing modulus and resilience. For samples of Witco M.R. or further information applicable to your own processing requirements, consult with a Witco technical representative.

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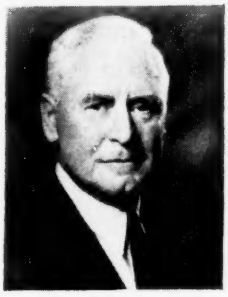

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INVENTOR OF THE BANBURY MIXER

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June, 1944

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Polymerization of Vinyl Derivatives in Suspension—I

W. P. Hohenstein,[1] F. Vingiello,[1] and H. Mark[1]

IN THE last few years several authors (1-20)[2] have succeeded in elucidating the mechanism of the polymerization of ethylene derivatives in the homogeneous liquid phase (either in bulk or in solution) to a considerable extent. It seems that the total reaction consists of several steps, which are chemically very distinct from each other, but take place simultaneously or in quick succession during the course of the polymerization (21-32).

There is first the *activation*. It can be effected by the action of heat or light or preferably with the aid of a catalyst (2, 3, 14, 16, 31-37). It should be mentioned here that it seems to be more appropriate to speak of an initiator or, still better, of an *initiating complex*, because there is much evidence for the fact that in many cases the so-called catalyst is consumed by the reaction, and fragments of it appear in the final polymer. In most practical cases, mainly revealed in the recent patent literature, one does not use a single initiator such as a peroxide, ozonide, or metal halide, but uses an initiating system, usually consisting of an oxidizing and a reducing agent. Both collaborate in producing the activated polymerization nuclei and maintain (at least over a certain period) a stationary concentration of them.

The next distinct step is the *propagation* or growth of the chains, which may consist in the simple rapid addition of monomer to the activated nucleus (3, 12, 16, 27, 33-38) or, in more complicated cases, results in the transfer of the capacity for propagation to another monomer.

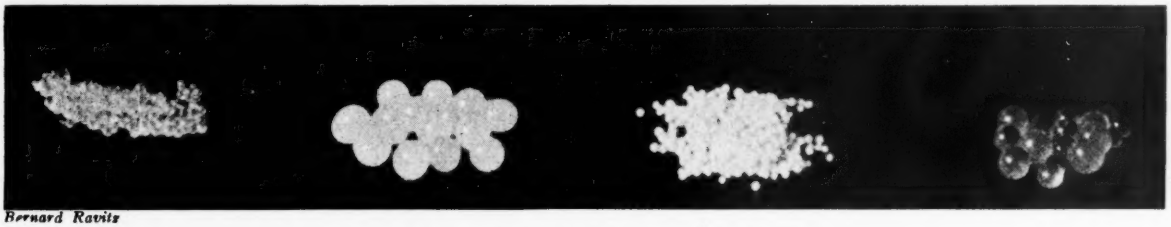
The third elementary reaction is the *termination* of the growing chains either by mutual saturation of the activated ends or by collision with molecules of the solvent or of any kind of deactivating impurities (1, 3, 11-14).

Finally, there are other processes, such as chain transfer (8, 12, 37, 39, 40) branching, or cross-linking which eventually interfere and result in the production of more complicated macro-molecules.

It has been possible to derive equations which, in homogeneous systems, allow the description of the interaction of activation, propagation, and termination and make it possible to precalculate the initial rate of monomer consumption and the number average polymerization degree of the reaction product in fair agreement with the experimental facts (1, 9-11, 14, 16, 21, 41). This may encourage the attempt to extend this kind of kinetic treatment to polymerization in heterogeneous systems.

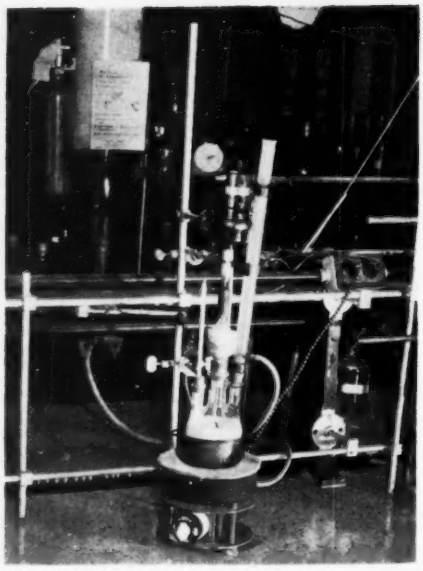
The most common types of heterogeneous polyreactions are polymerizations in suspension and emulsion (11, 41-43). Particularly the latter is of great practical value. There exists an extensive patent literature on it (examples of which are 34, 44, 45); while only few articles have appeared up to date in scientific magazines or books (41, 42, 43), the most informative of which is a recent

[1] Polytechnic Institute of Brooklyn, Brooklyn, N. Y.
[2] Bibliography references appear at the end of the article.



Bernard Ravitz

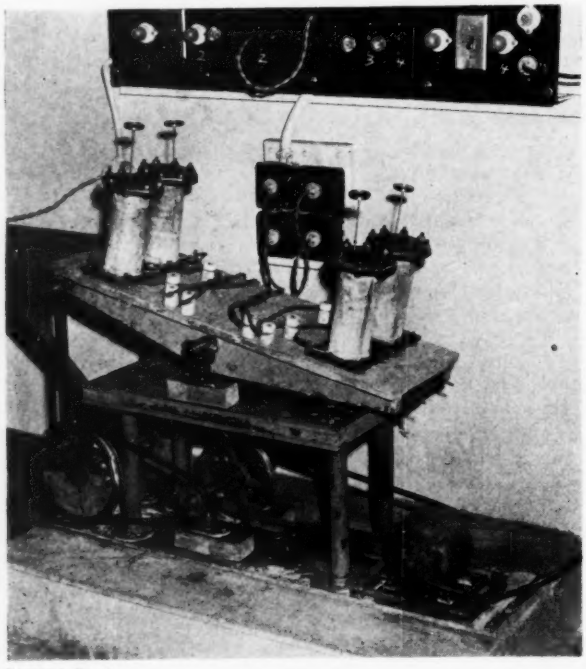
Fig. 1. Globular Products Obtained by Suspension Polymerization



Bernard Raritz

Fig. 2. Reactor Flask Used with High Boiling Monomers

paper by C. F. Fryling and E. W. Harrington (42). However it seems that the conditions for emulsion polymerization are more complex than those of the polymerization of a vinyl derivative in aqueous suspension, where, without the use of any emulsifying agent, macroscopic globules of easily measurable size (diameter between 0.1 and 10 millimeters) can be produced and maintained. It was therefore felt that a number of preliminary measurements on suspension polymerization might not be out of place. This article intends to give a qualitative description of the general procedure in "pearl" or "bead" polymerization; while another paper will try to propose a somewhat quantitative treatment of such processes.



Bernard Raritz

Fig. 3. Autoclaves and Agitating Mechanism for Low Boiling or Gaseous Monomers

In addition to these basic investigations that have been carried out in this laboratory during the last three years, the properties of the polymers produced by this method were studied. From a commercial point of view it appears that certain advantages might be expected from "pearl" polymerization. The procedure as such is simple, and the polymer is obtained in an easily manageable form. Temperature control is comparatively easy, and the homogeneity and purity of the product represent appealing features.

Figure 1 shows as an example a number of globular products as obtained by this procedure, and Table 1 gives a few representative figures of these materials.

TABLE 1. PROPERTIES OF "PEARL" POLYMERS

Material	Average Globular Size in Mm.	Average Molecular Weight	Appearance	Characteristics
Styrene	1½	85,000	Transparent	Hard, brittle
Styrene	¾	78,000	White, opaque	Hard, brittle
Chlorostyrene	2	67,000	Yellow, translucent	Hard
Chlorostyrene	½	78,000	Yellow, transparent	Hard

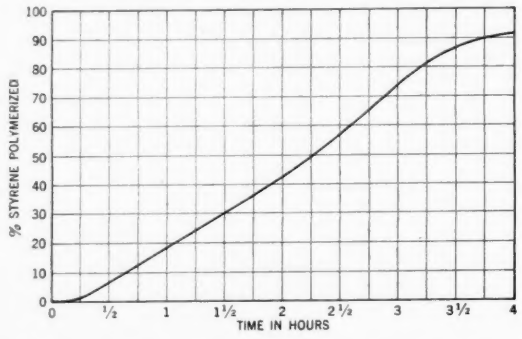


Fig. 4. Example of Suspension Polymerization Rate with Styrene

Experimental Conditions

The principle of this type of polymerization is that the liquid monomer is being dispersed in a non-solvent (in most cases water or aqueous solutions) by strong mechanical agitation and that polymerization takes place inside the small suspended globules. This eliminates the use of surface active materials and produces fairly pure substances since the globules themselves do not contain anything but the polymer and traces of a catalyst. It was soon found that, in general, mechanical agitation is not sufficient to prevent the monomer globules from coalescing at some time during the course of the reaction. It became evident that it would be advantageous to add certain substances to act as *suspension stabilizers*. Several patents (including 45) describe and protect the use of such stabilizers which may be of organic or inorganic origin. They do not stick permanently and closely to the final polymers, as soap or other surface active materials do, and can be easily removed at the end of the reaction by adequate washing or filtering processes.

A rather simple experimental arrangement can be employed. The polymerization is carried out in a three-neck flask, equipped with mercury seal stirrer, condenser, and thermometer. Figure 2 shows one of these flasks which has performed fairly satisfactorily. They could, of course, be used only for monomers whose boiling points lie above the reaction temperature. For the polymerization of lower boiling or gaseous monomers electrically heated autoclaves run on a shaking machine are necessary (compare Figure 3).

In the following we shall give some information about producing and polymerizing suspensions of various types. Different materials can be used to prevent the globules from agglomerating into a lump, and each one has its optimum proportions. One characteristic of a given suspension stabilizer is its capacity to maintain a certain definite average size of the polymerizing spheres in the suspension. Inefficient suspension stabilizers favor the formation of lumps when used in small proportions; while very large globules appear if higher proportions are employed. Table 2 illustrates some formulations and their merits.

TABLE 2. EFFECT OF DIFFERENT STABILIZERS ON SIZE OF "PEARL" POLYMERS

Grams							
Water	Hydrocarbon	Catalyst %	Stabilizer—%		Temperature—°C.	Hours	Globular Size/in Mm.
300	50	1	Talc	0.8	90-95	6	1
300	50	1	Polyvinyl alcohol	0.5	90-95	6	3
300	50	1	Gelatin	0.8	90-95	6	2
300	50	1	Bentonite	3.0	90-95	6	3

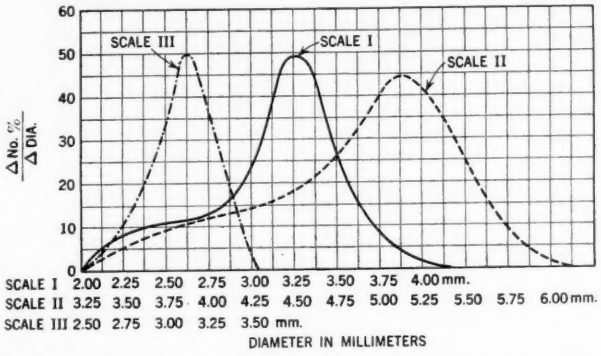


Fig. 5. Polymer Size Distribution Curves for Suspension Polymerized Styrene

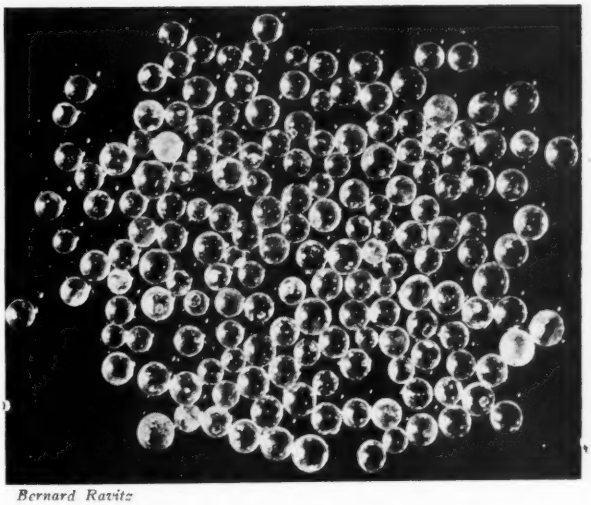
Catalysts, or rather initiators or activators, indicated for this method of polymerization are mainly of two types: namely, hydrocarbon soluble organic peroxides and water soluble inorganic peroxides or salts of peracids. It was observed that contrary to the experiences with emulsion polymerization the hydrocarbon soluble types proved distinctively more effective. (See Table 3.) A series of experiments carried out with styrene and benzoyl-peroxide at 90° C. showed that the rate of the reaction increased with the amount of peroxide used and that under the conditions prevailing in these runs the main part of the reaction takes place between the second and third hour.

TABLE 3. EFFECT OF SOME ORGANIC AND INORGANIC PEROXIDE ACTIVATORS ON STYRENE "PEARL" POLYMERS

Grams								
Water	Styrene	Talc %	Benzoyl Peroxide	Potassium Persulphate	Sodium Perborate	Temperature ° C.	Hrs.	Result
300	50	0.8		2%*		90	3	Stable suspension; little polymer formed
300	50	0.8	2%*			90	3	Polymer globules formed
300	50	0.8			2%*	90	3	Polymer formed
300	50	0.8			2%†	90	13	Little polymer formed

* % on weight of monomer.
† The initiator was added in three portions in one-hour intervals.

The ratio of water to hydrocarbon is of relatively small importance as long as one works with a sufficient excess of the aqueous phase. Favorable conditions seem to exist



Bernard Ravitz

Fig. 6. Styrene "Pearls" of Varying Degrees of Transparency

if one has between three and six times as much water as hydrocarbon. Higher proportions of monomer interfere with proper dispersion and make the temperature control more difficult.

Benzoyl peroxide initiates styrene polymerization in dispersion at temperatures above 50° C. (2, 14, 35, 36). The polymerization temperature is limited by the softening point of the polymer. Approaching it, the globules tend to merge and to yield lumpy masses which do not polymerize homogeneously and include some of the suspension stabilizer. In our experiments, therefore, temperatures of about 10° below the softening range of the reactant materials were used.

The pH of the aqueous phase has a definite influence on the ease of "pearl" formation. Alkaline conditions up

Bernard Ravitz

Fig. 7. Styrene "Pearl" Polymer before (left) and after Swelling in Toluene

to a pH of 10 do not interfere with the formation of pearls; while reduction of the pH even to 5.0 proves detrimental to the reaction.

Keeping the above points in mind it is comparatively easy to control the course of a "pearl" polymerization and to obtain globular polymers of any desired size.

The Suspension Polymerization Reaction

"Pearl" polymerization takes place in three rather definite steps. There is a first period during which the dispersed globules of the monomer remain liquid and show little or no tendency to coalesce as long as stirring is continued. This part of the reaction roughly corresponds to the induction period as observed in other polymerization processes. During the second step some polymer is formed in the globule and dissolves in the monomer, thus producing gummy and sticky particles which tend to merge with each other. Finally polymerization throughout the globule is more or less completed. The second (sticky) period is most critical for the outcome of the reaction since during it colloiding spheres are liable to agglomerate. At the beginning, while the reaction mass is still fairly fluid, such coalesced spheres are quickly broken up again, and toward the end the globules do not stick together as long as the temperature is kept below the softening point of the product.

Whether a particular material polymerizes in well-defined "pearls" or whether it lumps together seems to depend upon the stirring, the nature of the suspension stabilizer, and the difference between the density of the aqueous medium and the monomer. Best results are obtained by adjusting these three contributing factors carefully to an optimum degree. It seems that the finely dispersed stabilizers adhere to the surface of the spheres, and form a layer around them preventing coagulation, upon collision during the sticky period of the reaction. Superimposed on this phenomenon is the fact that an increased density of the aqueous medium helps prevent localization of the globules in one particular zone of the liquid. It is possible to carry out polymerization of monomers, such as styrene, acrylic derivatives, isoprene, etc., in aqueous salt solutions of various densities and in mixtures of water and glycols or glycerol.

The mechanism of the reaction seems to be essentially one of bulk polymerization (12, 21, 37). Only hydrocarbon soluble initiators, as benzoyl or laurvl peroxide, start the reaction effectively at temperatures between 40° and 80° C; while water soluble catalysts, such as hydrogen peroxide or sodium persulphate, are less effective. Also water soluble activators do not accelerate the peroxide catalyzed reaction noticeably. Qualitatively, it is apparent that the overall rate of monomer consumption, which is equivalent to polymer formation, is approximately proportional to the square root of the concentrations of the hydrocarbon soluble catalyst. This points to a radical chain mechanism for the reaction inside each individual globule. Owing to the small mass of monomer in the globules and to their extensive cooling by the aqueous medium, the temperature in the globules does not undergo significant variations. All this tends to show that "pearl" polymerization may be considered as a bulk polymerization with effective water cooling. It must be pointed out, however, that the rate of monomer consumption in suspension seems definitely greater than in bulk under equivalent conditions. We shall discuss in greater detail in another communication possible causes for this phenomenon. Here we wish to indicate only that it seems to be connected with an increased rate of nuclei formation in the case of "pearl" polymerizations. As an example of the speed of a reaction, Figure 4 describes a run of styrene at 85° C. and the amount of polymer formed at various time intervals.

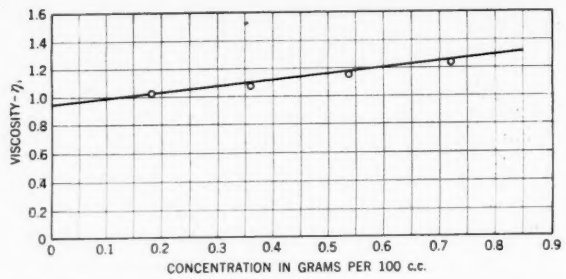


Fig. 8. Intrinsic Viscosity *vs.* Concentration for Styrene "Pearl" Polymers

The Resulting High Polymer

The polymers obtained in small-scale runs consist in most cases of rather perfect globules of fairly uniform size. Figure 5 gives the size distribution curves of three different batches of polystyrene. It is significant that in each of these curves the largest percentages of spheres occur in a relatively narrow size range, and the largest globules have diameters approximately twice that of the smallest. Depending upon the nature of the stabilizer and the final percentage conversion of monomer, the globules may be completely water clear (Figure 6), approaching in appearance the best block polymers, or may exhibit white opacity or all the intermediate degrees of translucency.

Mechanically the "pearls" can be hard, soft, or rubbery, depending upon the monomer or combination of monomers. Styrene and acrylic esters yield hard globules which exhibit considerable elasticity and toughness. These polymers are soluble in the usual solvents; while diene polymers or materials containing a diene yield insoluble spheres that show a distinct swelling in many liquids. Figure 7 shows such a "pearl" polymer swollen and suspended in toluene. This material is rubbery and semi-transparent and apparently consists of globules which are cross-linked to a considerable extent. If carried out in bulk, such a copolymerization leads to an insoluble and infusible gel which is very difficult to remove from the reaction vessel. "Pearls" of this material, however, can be easily removed from the reaction flask and represent a material which offers no difficulties for rolling or calendering operations.

In order to get an idea of the degree of polymerization of some styrene "pearl" polymers, the viscosity average molecular weight was determined (39-41, 46, 47). Solutions of the polymer in toluene ranging from 0.2-0.8% were made, and their viscosities measured in the usual way. The intrinsic viscosities of the solutions were obtained by extrapolating the η sp/c *versus* concentration graph (see Figure 8) and the molecular weights computed from the equation: $[\eta] = KM^a$, using for K and a the values of 10^{-2} and 0.72 respectively. Table 4 gives a few examples of molecular weights of polystyrene "pearls" and shows that the molecular weight is of the order of magnitude of 85,000 even under somewhat varying reaction conditions.

Table 4. Molecular Weights of Styrene "Pearl" Polymers

Grams		% Suspension	%	Time	Temperature	Molecular
Styrene	Water	Stabilizer	Catalyst	Hours	°C.	Weight
50	300	Talc 1	1.0	3	85	85,000
50	500	Bent. 3	0.5	15	75	80,000
50	500	Bent. 3	1.0	15	75	83,000
50	500	Bent. 3	0.75	19	75	85,000
50	500	Bent. 3	1.0	48	65	93,000

(*Continued on page 300*)

Report of the Crude Rubber Committee, Division of Rubber Chemistry, A. C. S.[1]

G. A. Sackett[2]

THE Crude Rubber Committee has been asked to gather information on the properties, processing, and use of wild rubbers. With the present state of affairs in the production and availability of wild rubber the present report can cover only general observations and conclusions. As time passes and the demands of industry are felt, and as synthetic rubber production is increased and more experience is gained with it, the relative value of some types is bound to change, and a type which is used now may not be desirable some months hence.

Properties and Use of Wild Rubbers

Since wild rubbers are gathered by natives who live and work in the jungles and away from machines and transportation, it is only to be expected that there will be no uniformity of product. Foreign material is always present, and any natural resins found in the latex will be found in the product. Moisture content will vary greatly from piece to piece, and variations in the degree of oxidation are to be expected always. Any data on resin content or shrinkage must therefore be considered as general observation and not a characteristic of a specific type. Curing and processing characteristics are also widely variable, and data on these also are subject to extremely wide variations.

Shrinkage is the loss in weight between the material as received and the final product after washing and drying. Some of this is due to dirt and some to moisture. Regardless of the cause, however, all wild rubbers must be washed and dried before use, so that the shrinkage is a real economic factor. Those rubbers, however, which have little foreign material compared to the moisture present, even though the degree of shrinkage is about the same, are preferable, because the washing is easier and more efficient.

Resins are not removed by washing. Since a regular extraction process is needed for their removal, the final product contains a higher actual percentage of resin than the original due to the shrinkage in weight by removal of dirt and moisture. High resin content denotes a soft rubber, and soft rubbers are very difficult to wash free of foreign material. The resin also affects the vulcanization characteristics and the processing behavior. Thus, low-grade scrap rubber is always high in resin and has poor physical characteristics, such as low tensile and modulus, and also imparts a degree of softness to the uncured product. Adjustment of softener content should always be made when high-resin wilds are added to a compound.

The high-grade wild rubbers can be used as a direct replacement of plantations in most cases. Thus a substitution of Para or Manicoba will yield a good product. Since most of the use of wild rubbers is in conjunction with synthetic, this substitution will usually have little effect, but it should always be checked. Variations in compounding and in service demands do not allow a blanket statement of the comparative behavior of any rubber type.

The bulk of our wild rubber comes from South America, and from various botanical species. While Africa produces a good volume of wild rubber, there has not been so much experience gained with the African types as with the American types. Generally speaking, however, the high-grade and low-grade rubbers from either continent follow a similar pattern.

Wild rubbers should always be blended by the rubber manufacturer. In this way the effect of variations is minimized, and it is possible to utilize a small percentage of the lower-grade materials. As time goes on, it is to be expected that improvements in preparation of rubber will be made, not so much by the native who gathers the original latex, but rather by processors in the market centers. Every encouragement in this direction is worth while because encouragement of the native processor will lead him to induce the rubber tapper to improve his product. This has always been true in any product and is not confined to rubber.

Some of the important rubbers have been examined and the results are listed in Table 1. The figures reported are averages from several actual commercial lots. The shrinkage was calculated from the difference between invoiced weight and "washed and dried" weight. The ash and resin values were determined on samples taken after washing and drying.

There is always a wide variation between lots of the same type or grade because of the looseness of grading. Admixtures of other botanical species than that regularly considered as typical of the grade are often found. There is also a wide difference in methods of preparation.

Any data on wild rubbers must be considered as typical and not truly representative. Except for shrinkage, all tests, both chemical and physical, are made on the material after washing and drying. With this in mind, the following table is given for its value as general information, as the range of actual values may be quite wide.

TABLE 1. PROPERTIES OF AMERICAN WILD RUBBERS

Name	Geographical Origin	Botanical Origin	% Ash	% Resin	% Shrinkage
Paras					
Cut Fine	Brazil	*Hevea*	.37	3.06	16.97
Uncut Fine	Brazil	*Hevea*	.45	3.62	19.79
Weak Fine	Brazil	*Hevea*	.38	10.38	15.30
Upriver Coarse	Brazil	*Hevea*	2.12	6.24	24.24
Islands Fine	Brazil	*Hevea*	.31	4.08	13.90
Bolivian Uncut	Bolivia	*Hevea*	.49	2.94	15.90
Peruvian Fine	Peru	*Hevea*	.67	3.63	14.32
Scrap	Ecuador	*Hevea*	.99	4.68	17.96
	Guatemala	*Hevea*	.40	8.60	25.86
	Honduras	*Hevea*	.99	4.82	21.80
	Costa Rica	*Hevea*	1.40	2.23	22.43
	Panama	*Hevea*	.70	4.05	25.75
	Columbia	*Hevea*	.82	6.20	17.38
	Nicaragua	*Hevea*	1.40	6.11	19.60
Manicoba	Brazil	*Manihat*	4.30	3.40	20.00
Ceara	Brazil	*Manihat*	1.75	7.15	....
Mangabeira	Brazil	*Hancornia*	.58	13.07	36.45
Caucho Ball	Brazil	*Castilloa*	....	....	....

The word "fine" denotes a clean firm rubber. In addition to this we also have the terms "interfine" which denotes a lower grade, "*sernambi rama*" which is tree scrap or ground scrap, and "*sernambi cameta*" which is naturally coagulated latex, usually in the collection cup. The Paras are also designated by district such as "Islands" which is the district at the mouth of the Amazon, "Upriver" or

[1] Abstract presented in April before meeting of the Division in New York.
[2] Goodyear Tire & Rubber Co., Akron, O., and Chairman of the Division's Crude Rubber Committee.

"Acres" which is from the Acre region, and "Lowers" which takes in all other districts.

Most of the Para is cut before being placed on the market. This is to show the condition of the interior of the biscuit. The cut fines should be completely cut on both ends. Those which are not so cut are called *"san grada"* and usually have a higher moisture content. The "weak fines", which are also sometimes known as *"sernambi rama"*, contain larger amounts of resin, and so the rubber is softer than the usual fines.

The "scraps" are all rather low-grade rubbers. Ecuadorian scrap usually rates a little better than the others. All must be completely washed and can be used in small percentages by blending with the better grades.

Manicoba often contains fine sand, but much of this material is well prepared and quite desirable. *Ceara* scrap contains much bark and wood and often is difficult to clean so that the rubber becomes satisfactory for use. Mangabeira is high in resin content and soft. It deteriorates very rapidly with age. This material should not be stored long in the crude state. Castilloa yields a fairly satisfactory rubber of good properties.

All of the types listed can be obtained in a washed and dried form. When so obtained, they are ready for use without washing, but careful inspection must be made to be sure that admixture with other types has not been effected in the washing operation.

The Paras will be found much more difficult to break down than the plantation rubbers. They will be more difficult to process as they retain more "nerve" after being broken down on the mill.

Evaluation of Physical Properties

There is much variation in the physical properties of the vulcanizates, obtained in the A.C.S. formula. It has been found, however, that by increasing the amount of stearic acid a considerable improvement in physical properties is effected. This is shown in the table below.

The formula used is given here, and it is proposed that this formula be adopted tentatively as A.C.S. II; while the previous will be known as A.C.S. Formula I. The Formula II is intended for testing wild rubbers and slow curing rubbers generally. There is little doubt but that physical properties can be improved by the use of activators of Captax such as amines or litharge, but these may require adjustment, and the present Formula II is a simple change.

TABLE 2. A. C. S. EVALUATION FORMULAS

A. C. S. Formula	I	II
Rubber (for test)	100.00	100.00
Zinc Oxide	6.00	6.00
Sulphur	3.50	3.50
Stearic Acid	.50	4.00
Captax	.50	.50

TABLE 3. PHYSICAL TEST RESULTS WITH BOTH A. C. S. FORMULAS

	Formula I		Formula II	
	Lbs./Sq. In.		Lbs./Sq. In.	
Rubber	Tensile	600% Modulus	Tensile	600% Modulus
Para				
Cut Fine	2230	781	2940	1509
Uncut Fine	2381	835	2978	1510
Weak Fine	1650	700	2475	1200
Upriver Coarse	1860	675	2416	1619
Islands Fine	2288	1100	2885	1738
Bolivian Uncut	2050	625	2250	1375
Peruvian Fine	2550	950	3325	1850
Scraps				
Ecuador	1295	312	2181	632
Guatemala	775	125	2050	400
Honduras	50	50	75	75
Costa Rica	550	175	2450	375
Panama	950	225	1300	450
Columbia	502	133	1890	397
Nicaragua	240	70	1620	325
Manicoba	2892	1680	3386	1720
Ceara Scrap	2850	2050	3636	2450
Mangabeira	1044	90	1950	215

A comparison of the results of the two formulae in testing the rubbers above is in Table 3. Comparison of the 60-minute cure at 260° F. is shown.

In some cases, notably the Honduras and Panama scrap, there is little change in properties resulting from two formulae. The improvement in the others is evident. Why the increased stearic acid improves the physical properties is not exactly known, but no doubt is due to a deficiency of fatty acid in the crude material.

It is interesting to observe the modulus comparison of the two formulae at different cures.

TABLE 4. COMPARISON OF MODULUS VALUES

	Formula I			Formula II		
Cure	30/260	60/260	90/260	30/260	60/260	90/260
	Lbs./In.²—600% Modulus			Lbs./In.²—600% Modulus		
Rubber						
Para						
Cut Fine	628	781	864	893	1509	1784
Uncut Fine	700	835	940	945	1510	2088
Weak Fine	475	700	750	575	1200	1200
Upriver Coarse	600	675	744	888	1619	2050
Islands Fine	850	1100	1200	960	1738	2510
Bolivian	400	625	675	825	1375	1800
Peruvian	625	950	1000	1025	1850	2200
Scraps						
Ecuador	145	312	386	275	632	888
Guatemala	...	125	275	150	400	675
Honduras	No Cure	50	100	No Cure	75	125
Costa Rica	100	175	75	200	375	425
Panama	75	225	275	150	450	675
Columbia	No Cure	133	228	130	397	730
Nicaragua	37	70	90	135	325	405
Manicoba	1200	1680	1685	1165	1720	1895
Ceara Scrap	1662	2050	2050	1780	2450	2712
Mangabeira	45	90	103	105	215	235

The results of Formula II do not show overcure in the longer cure.

The African rubbers have not been studied in detail. However, George Martin, of the Imperial Institute, has given a very careful study in the *Transactions of the Institution of the Rubber Industry*,[3] and reprinted in *Rubber Chemistry and Technology*.[4]

In conclusion, the Crude Rubber Committee wants to point out that the data given in this report are representative of the samples tested. Other lots may vary widely from those shown, and a larger volume of information would be helpful in widening our knowledge of wild rubbers. Any data, therefore, which members may have should be sent to the chairman of the Committee, and an attempt will be made to analyze them and publish the results for the benefit of all members of the Division.

[3] 19, 1, 38-52 (1943).
[4] 17, 1, 240-52 (1944).

Standard for Hospital Sheeting

To provide civilian hospitals with a guide for the selection of satisfactory substitutes for rubber hospital sheeting, Hospital Sheeting for Mattress Protection, Commercial Standard CS114-43, was prepared by the Division of Trade Standards, United States Department of Commerce, with the assistance of leading manufacturers and a committee of the American Hospital Association. The standard was adopted by the industry and became effective December 1, 1943. It covers requirements and methods of test for fabrics coated on both sides or impregnated with a suitable compound. The standard includes requirements for thickness, breaking strength, tearing strength, resistance to mineral oil and disinfectants, resistance to sterilization, accelerated aging, cracking, and moisture penetration. A burning rate limit is included to prevent the use of flammable materials that would constitute a fire hazard. The manufacturer is allowed almost complete latitude in the selection of fabrics and coating or impregnating materials.

Morphology of Latex Particles as Shown by Electron Micrographs

S. B. Hendricks,[1] S. G. Wildman,[1] and H. F. McMurdie[2]

IN THE COURSE of other work on latex formation in plants it seemed desirable to examine the morphology of the constituent particles under higher magnification than had been possible previously. Extensive microscopic work was carried out by Hauser[3] on latices from many plants. He also made use of micro-manipulator in a number of experiments that are widely quoted. Lucas[4] used the ultra-violet light microscope for observations on particles in preserved *Hevea* latex. Recent availability of the electron microscope permits an extension of observations on latices.

Micrographs were made with an R.C.A. Type B electron microscope. The construction and operation of this microscope have been described elsewhere.[5] In this instrument the specimen is placed in a high vacuum; the pressure is about 10^{-4} millimeters of mercury. The micrographs were made in most cases at an initial magnification of 4,000-8,000 diameters and were further enlarged optically. Particular advantages of the electron microscope, as compared with usual and ultra-violet microscopes, are its greater depth of focus and resolving power. The number of particles examined on a film, however, is restricted by the high magnification and the great dilution of the sample necessary to obtain separate particles. A large number of particles were observed before micrographs were taken, and it is considered that those reproduced here are typical.

Latex samples were generally diluted with 1% ammonia until only faintly turbid. A drop of the dilute suspension was dried at room temperature on a thin Formvar film supported on a 200-mesh nickel screen, which was cut to be placed on a holder for inserting into the microscope. *Hevea brasiliensis* (H.B.K.) Muell. Arg., *Hevea spruceana* (Benth.) Muell. Arg., *Taraxacum kok-saghyz* Rodin, *Cryptostegia grandiflora* R. Br., *Asclepias syriaca* L., *Ficus elastica* Roxb., and *Castilla elastica* Cerv. latices were obtained locally. Plants approximately one year old of the first five species were brought to the microscope room to serve as an immediate source of latex supply. Several samples of *Taraxacum kok-saghyz, Ficus elastica,* and *Hevea brasiliensis* latex were diluted with distilled water only before drying on the Formvar film. Latex generally was obtained from the base of a petiole severed midway along the plant. In the case of *Taraxacum kok-saghyz* it was obtained from the lowest portion of the root.

Manihot glaziovii Muell. Arg., *Funtumia elastica* (Preuss) Stapf, *Vallaris solanacea* (Benth.) K. Schum., *Mascarenhasia elastica* Schum., *Alstonia scholaris* (L.) R. Br., *Mimusops balata* (Aubl.) Gaertn., *Landolphia droogmansiana* Wildem., and additional *Hevea brasiliensis* latices, preserved in 2% ammonia and taken from plants five to fifteen years old, were obtained from the U. S. Plant Introduction Garden at Cocoanut Grove, Fla., through the courtesy of J. H. Heuer and J. A. Elder. *Manihot dichotoma* latex from the same location was preserved in 2% sodium carbonate. Since these latices were not examined until a week after collection and were necessarily shipped, they might have undergone some change. The main purposes in examining them were to seek for unusually shaped particles that might have withstood this treatment and to get some information on latices from relatively old plants.

Experimental Results

The limitations and restrictions of the electron microscope must be borne in mind in this discussion of results. To study a latex specimen it must be diluted, dried on to a Formvar membrane, and then placed in the vacuum of the microscope and photographed. The liquid particles wet the membrane to some degree and spread. In some cases this spreading brings two or more particles into contact, and they may then flow together. Volatile components which may be present are evaporated, with a possible further change in shape. Any non-volatile matter either suspended or in solution in the water with the latex particles will still be present in the specimen and contribute to the background in various ways.

Results obtained are illustrated by the accompanying electron micrographs, the most striking features of which are pointed out in the legends. Particles which were spheres in the original latex are always flattened to various degrees. Some idea of the amount of flattening can be obtained by a comparison of the optical density at the center and edges of the particle in the micrographs. The extremes of flattening are illustrated by the micrographs of *Crypstostegia* (Figue 3D) and *kok-saghyz* (Figure 3C). A break in the mounting membrane of a *kok-saghyz* specimen gave an opportunity for making observations approximately parallel to the film surface (Figure 4). This shows the particles in profile to be lens-shaped and to have diameters about three times the heights.

Morphological features of *Hevea brasiliensis* latex particles are in general similar to those described in detail by Lucas.[4] The smallest particles are about 0.03-micron in diameter. So-called "pear-shaped" particles, long considered to be characteristic of *Hevea* latex, are apparent in Figure 1. They also were observed on electron micrographs of other latices. These pear-shaped particles appear to be formed by coalescence of small spheres. Latex particles in *kok-saghyz* are smaller than found for *Hevea;* the smallest observed particle is of the order of 0.01-micron in diameter. (Figure 3C.)

None of the other latices examined contained particles less than 0.1-micron in diameter, and all showed evidence of coalescence similar to that illustrated in the figures. It is, of course, possible that the smaller particles may have been destroyed in the latex samples shipped from Florida. Particles in the latex from *Mimusops* and *Castilla* were several microns in diameter and showed a pronounced tendency to flatten, indicative of considerable fluidity. *Ficus, Funtumia,* and *Mascarenhasia* latex particles were similar in morphology to those illustrated for *Hevea.*

[1] Bureau of Plant Industry, Soils, and Agricultural Engineering, United States Department of Agriculture, Washington, D. C.
[2] National Bureau of Standards, United States Department of Commerce, Washington, D. C.
[3] E. A. Hauser, *"Latex."* Translated by W. J. Kelly. Chemical Catalog Co., New York, 1930.
[4] F. F. Lucas, *Ind. Eng. Chem.*, 30, 146 (1938); 34, 1271 (1942).
[5] E. F. Burton and W. H. Kohl, *"The Electron Microscope."* Reinhold Publishing Corp., New York, 1942.

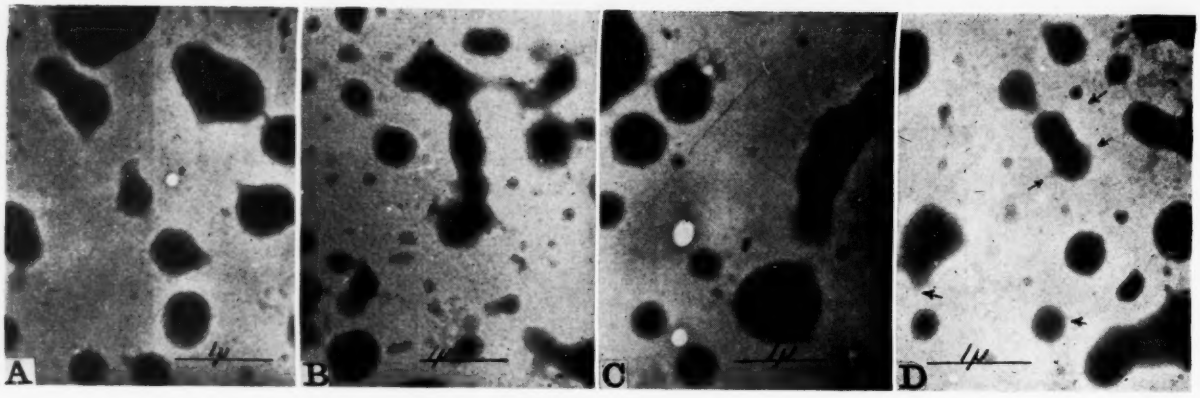


Fig. 1. Electron Micrographs of *Hevea brasiliensis* Latex Particles

A. Large particles approximately 0.6-micron in diameter. Several pear-shaped particles show evidence of coalescence of small spheres. B. A chain more than two microns in length in which spherical particles are incompletely coalesced is prominent in the upper part of the micrograph. Small particles less than 0.1-micron in diameter can be observed below this chain. Some of these smaller particles are incompletely coalesced into groups of two or more particles several tenths of a micron in length. C. Particles ranging from about 0.03-micron to 1.0-micron in diameter. A chain formed by coalescence of at least four particles with diameters near 0.5-micron is present. Transparent circles in this and other micrographs are holes in the Formvar supporting film. D. Surface irregularities (indicated by arrows) on large particles indicating coalescence of small spheres (circa 0.03-micron in diameter). Mottling in the background of this and other micrographs is in part due to action of ammonia, used to prevent coagulation, on the Formvar film.

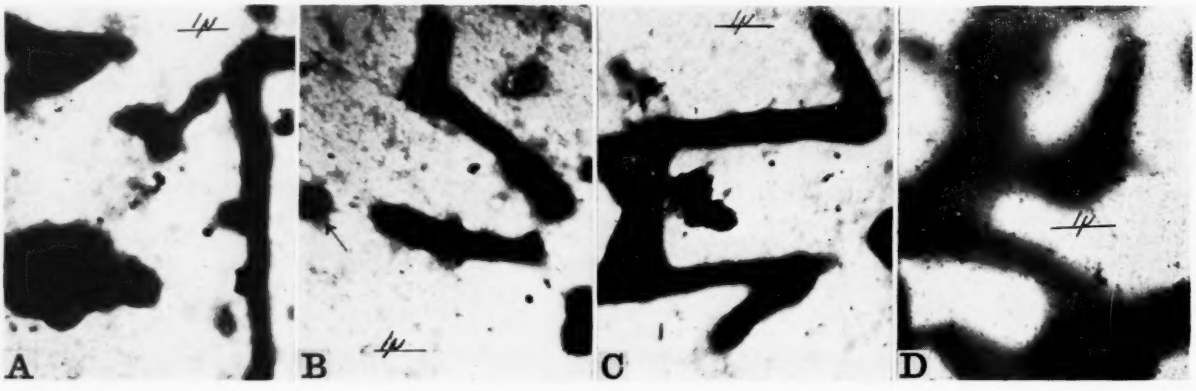


Fig. 2. Electron Micrographs of *Manihot glaziovii* Latex Particles

A, B, and C. Rod-shaped particles several microns in length and about 0.5-micron in diameter. Round particle having approximately the same diameter as the rods is indicated by arrow in B. These particles can also be seen as parts of some of the rods. The contrast at the particle boundary is greater for *Manihot* latex than for *Hevea*. A filamentous material that can perhaps best be described as fuzzy is present at the particle boundaries. D. Creamed *Manihot* latex. The boundary surfaces of the rods are disrupted, and coalescence is apparent.

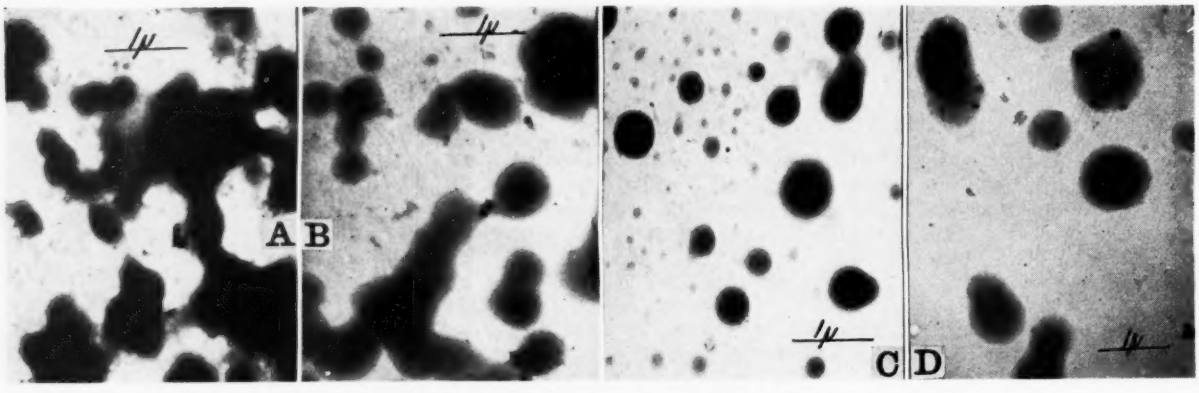


Fig. 3. Electron Micrographs of Various Latex Particles

A. *Funtumia elastica*. A partially coalesced mass showing some particles about 0.4-micron in diameter. In the upper half of the photograph, ten or more of these particles are joined in an irregular chain. Boundaries of the mass are thin and irregular. B. *Hevea spruceana*. Particles about 0.3- to 0.6-micron in diameter are coalesced into chains whose boundaries are regular though thin. C. *Taraxacum kok-saghyz*. Very small particles with distinct boundaries. The contrast on even very small particles is pronounced, indicating that the particles are not so greatly flattened on the supporting film as they probably are in B and D, and Figure 1 A-D. D. *Cryptostegia grandiflora*. Very fluid particles showing low contrast. The more opaque small fragments around the edge of the particles may be another latex constituent.

Electron micrographs, Figure 2, of *Manihot glaziovii* latex from a fifteen-year-old tree show the characteristic rod-shaped particles previously observed with light microscopes.[3] Spherical particles, as observed by Memmler,[6, 7]

Fig. 4. Electron Micrograph of *Taraxacum kok-saghyz*

Torn portion of Formvar supporting film showing latex particles in profile. The particles are partially deformed by the folds of the film.

which are said to be predominant in latex of young trees, are also revealed by the electron micrographs. The diameters of both flattened rods and spheres are approximately the same, and the rods give evidence of containing incompletely destroyed spheres. Freundlich and Hauser[8] from experiments with a micro-manipulator concluded that the rods consisted of tough, homogeneous material.

While the boundaries of the rods of *Manihot glaziovii* are quite sharp in some cases, in others the boundaries have become vague and the rods quite flattened. An example of such a case is shown in Figure 2D. Much finely divided granular material is seen along what appear to be the former rod boundaries. While the source and nature of this granular material are not known, its relative opacity indicates that it is of a much higher atomic density than the rubber. Granular material was also observed to a lesser extent in several other latices, as is illustrated by the micrographs of *Cryptostegia* (Figure 3D) and *Manihot glaziovii* (Figure 5D). In Figure 2B the upper rod shows a vague outline in the center. This appears to be a transitional step between the sharp rods and material such as is seen in Figure 2D. A smilar phenomenon was also noted for several rounded particles in balata (*Mimusops*) latex.

Less well-developed rod-shaped particles are shown on electron micrographs (Figures 5A and D) of a second sample of *Manihot glaziovii* latex. A picture of *Manihot dichotoma* latex that had been preserved with sodium carbonate is shown in Figure 5C. These particles instead of being rod-shaped are round. Some rod-shaped particles, obviously not rubber, are also present. It is possible that they are produced by the preservative and are not characteristic of the latex. Observations under an oil immersion lens indicated the presence of rod-shaped particles having no observable birefringence.

Discussion of Results

It was of interest to find such extremely small particles in some cases. The smallest particles must be composed of only a few molecules since their size is of the order of 0.01-micron (10^{-6} centimeters) and they are flattened and probably contain some material other than rubber. Thus the molecular weight in such a particle, if it contained but a single molecule, would be considerably less than 300,000. This is well within the molecular weight range of rubber (50,000-1,000,000).

Observations of this and earlier work indicate that latex particles in many plants have form-retaining as well as fluid properties. The fluid property is clearly necessary for coagulation of a latex; while form retention is required for existence of concentrated latices. Fluid properties on a microscopic scale were demonstrated by Freundlich and Hauser's experiments with probes on large latex particles. They are also evident in the electron microscope in the flattening of particles and the binding together into masses. The form-retaining property is shown by persistence of particles containing partially assimulated spheres such as "pear-shaped" ones.

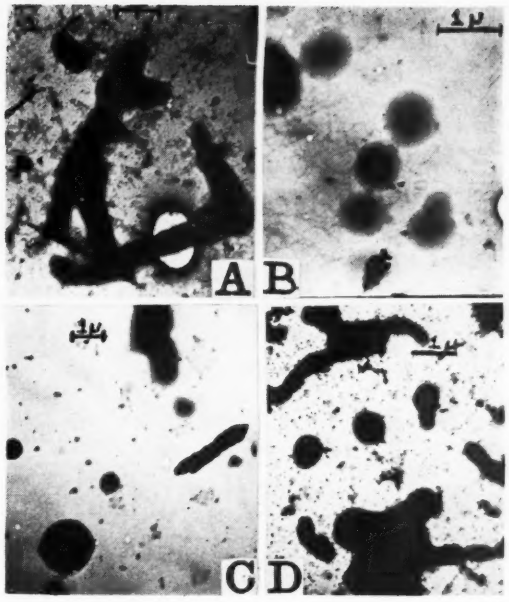


Fig. 5. Electron Micrographs of Various Latices

A. *Manihot glaziovii*. Showing rod-like particles. B. *Ficus elastica*. A chain of three latex particles which have apparently united by restricted coalescence of the particles around points of contact. C. *Manihot dichotoma*. Round particles and an elongated non-rubber rod. D. *Manihot glaziovii*. Several spherical particles appear near the center of the micrograph and an irregular mass of partially coalesced spheres is shown near the bottom. An irregular rod-shaped particle is present in the upper left corner.

An apparently simple and direct explanation from these properties is that proposed by Freundlich and Hauser,[8] who postulated that the latex particles were covered by a surface shell or film with a more fluid interior. Kemp[9] suggested that the film consists of an outer transitory liquid layer, an intermediate protein film, and an inner skin of gel rubber. The fluid interior is postulated to be an emulsion of sol rubber.

While this concept is simple, there is a serious argument against it: namely, a mechanism for separation of two fractions of rubber in the latex is implied. Gel and sol rubber have the same composition, as far as is known. They differ chiefly in their solubility in organic solvents. Gel rubber, by definition, is that portion of a rubber sample that swells rather than dissolves in solvents such as ether. It is reasonably held that this behavior is the result of "cross-linking" between portions of the hydrocarbon chain or chains in gel rubber. Since solubility depends to a great extent upon similarity of solvent and solute, complete miscibility is expected for substances such as sol and gel rubber which form the greater part of *Hevea* latex particles.

Properties of latex particles are equally in harmony with a simpler picture which should be general for long-chain polymeric substances. According to it, the molecules are simply intertwined as if they were odd lengths of string packed into a loose ball. If two such particles touch, loose ends and kinks of the molecules at the surface intertwine. One sphere, however, would only slowly be absorbed into another, and the shapes and retention of form would be expected. Withdrawing of an introduced probe would be

[6] K. Memmler, *"The Science of Rubber."* Translated by Dunbrook and Morris. Reinhold Publishing Co., New York, 1934, p. 57.
[7] A. Zimmerman, *"Der Manihot Kautschuk."* Q. Fischer, Leipzig, 1913, p. 133.
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[9] A. R. Kemp., *Ind. Eng. Chem.*, 30, 154 (1938).
V. K. Zworkyin, J. Hillier and A. W. Vance, *Elect. Eng. Trans.*, 60, 157 (1941).

expected to drag out some material and might well give the impression of puncturing a surface film or layer covering a fluid interior.

The latter hypothesis perhaps more readily explains why some particles, such as those of *Cryptostegia* latex in Figure 3D, can be so greatly flattened on the supporting film. According to it, the contents of the whole particle could be sufficiently fluid to spread as a normal drop. The first hypothesis would require a readily extensible surface film to account for large changes in surface without change in volume.

Latex particles of *Manihot glaziovii* might indeed have some type of surface film of which the granular material in Figure 2D could be remanent. This would be an inversion of Freundlich and Hauser's[8] conclusions that the *Manihot* particles are tough and uniform. Several observations bear on this question; principal among these is the finding that the latex of young trees contains dominant spherical particles that ostensibly disappear by formation of rods as the trees age.

This formation of rods by union of spheres is also borne out by the electron micrographs which give evidence of spheres combining in masses as well as in rods. Rod-shaped particles upon close examination are found to be only approximately linear, and joined rods apparently form any angle. It would seem that while spheres are forced into roughly linear aggregates, linear groups of spheres do not join colinearly.

There seems to be no reason why strictly physical factors, such as surface tension, Brownian motion, etc., irrespective of whether or not their operation is understood, should alone account for linear union of spheres in one latex and not in another. Two ways out of this impasse appear: namely, (a) some material favoring linear aggregation is present in *Manihot glaziovii* latex, or (b) a biological factor such as rod formation only at a particular site is operative. In the former case, by way of illustration, the material could be rubber itself, cellulose micelles, or starch molecules. In the latter case capture of spheres by a growing particle might take place only on contact with a cell wall. The apparently slow increase of linear particles with age of tree might be in favor of some explanation of the latter type.

Summary

Morphological features of particles from latices of 16 plant species were studied by means of electron micrographs, a number of which are reproduced. The smallest particles have about the volume required to contain a very small number of molecules. Evidence is given for both form-retaining and fluid properties of latex particles. Difficulties with the hypothesis that these particles have fluid interiors covered by a surface film of gel rubber are pointed out. A new hypothesis accounting for the observed properties is advanced. According to it, the latex particles contain rubber molecules entwined as if they were odd lengths of string with other latex constituents held between the meshes.

Polymerization of Vinyl Derivatives

(*Continued from page 294*)

Conclusions

To achieve polymerization in suspension specific reaction conditions have to be worked out for each monomer.

The polymerization itself seems to proceed like an effectively cooled, speeded-up bulk polymerization.

The resulting high polymers appear in the form of regularly formed spheres of controlled and fairly uniform size. They may be translucent or opaque, hard, soft, or rubbery, soluble or only swellable according to the monomor or combinations of them. The average molecular weights of polystyrene "pearls" under prevailing reaction conditions are around 100,000.

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(46) A. Bartovics and H. Mark, *J. Amer. Chem. Soc.*, 65, 1901 (1943).
(47) P. J. Flory, *Ann. N. Y. Acad. Sci.*, 44, 419 (1943).
(48) M. L. Huggins, *J. Phys. Chem.*, 46, 151 (1942).

Sulphur Shipments Larger

Native sulphur shipments were 801,122 tons, and apparent sales 806,070 tons, in the first quarter of 1944, as compared with 581,753 and 663,883 tons, respectively, in the same period in 1943, according to figures recently released by the United States Department of the Interior. Production in the first three months of this year totaled 595,593 tons, as compared with 664,611 tons in 1943. Producers' stocks on hand March 31, 1941, were 4,251,744 long tons.

Abstracts of Technical Data in the Field of Synthetic Rubber Seized by the Alien Property Custodian—IV[1]

Frederick W. Breuer[2]

DEVULCANIZING. Sartorelli, A.P.C. Serial No. 326,973, March 30, 1940. A reclaiming procedure for natural rubber consists in first swelling the pea-sized peelings with an equal weight of a naphtha fraction boiling above 250° C. for 12 hours at room temperature, following which the scrap is treated for 3-4 hours at 12-15 atmospheres pressure with a 5° Baumé solution of caustic soda. Procedures for almost quantitative recovery of the chemicals are given. Reclaim properties: reaction, neutral; ash, 7-10%; acetone extract after 24 hours, 2-5%; chloroform extract after six hours, 13-20%.

Reclaiming. Bemelmans, Abandoned Application Serial No. 391,091, April 30, 1941. Heating vulcanized rubber to 100-130° C. in the presence of 3-6% by weight of abietic acid is proposed. (The use of resins in the prior art was cited against this application.)

POLYMERS AND CONDENSATION PRODUCTS

Diolefin Vinylhydrocarbon Copolymers

Buna S of High Styrene Content. I. C. Farbenindustrie, A. G., A.P.C. Pending Application Serial No. 334,574, May 11, 1940. Butadiene styrene copolymers of 45 to 70% styrene content possess high plasticity and solubility, which are paralleled by increased strength, elasticity, and tack. 70% conversion is suggested. A compounding recipe is given. (This process resembles the one applied for in this country for GR-S.)

Copolymers with Vinyl Pyridine. Gumlich, (I. G.), Abandoned Application Serial No. 253,351, January 28, 1939. Copolymers of butadiene and butadiene with styrene with alpha vinyl pyridine possess superior elastic properties. (This application was rejected over prior art disclosing vinyl pyrols and other vinyl substituted heterocyclics.)

Copolymers with Mineral Oil Bitumen. Hengden, A.P.C. Serial No. 383,057, March 12, 1941. Mineral oil bitumen, particularly after distillation, can be polymerized with diolefins, including chloroprene, vinyl, and acrylic derivatives, to give products resistant against 60% sulphuric- and concentrated nitric acids. Copolymerization of the bitumen is claimed.

Halo (Alkoxy)—Prene Polymers

Solvent for Synthetic Chlorinated Rubbers. Kummel, A.P.C. Serial No. 279,151, June 14, 1939. Methyl isopropyl benzene alone or in mixture with organic esters and aromatics is particularly suited as solvent for polymers containing chlorine.

Heat Stabilization of Chlorinated Polymers. I. G. Farbenindustrie, A. G., A.P.C. Pending Application Serial No. 389,417, April 19, 1941. Heat stable chlorinated polymers are obtained by treatment with sodium carbonate and diphenylthiourea, whereas A.P.C. Serial No. 391,512 applies to higher aliphatic alcohols in combination with carbonate.

Heat Stabilization of Polymers Containing Chlorine. Fikenscher et al, A.P.C. Pending Application Serial No. 391,512, May 2, 1941. Addition of 0.5 to 4% higher boiling alcohol (dodecyl-, octadecyl-, phenyl-ethyl-, hydroxyethyl cresol-, naphthol, decahydronaphthol, hydroxydodecahydrodiphenyl) to a polymer stabilized with alkali carbonate increases its heat resistance, as evidenced by absence of discoloration of thin films.

Odor Free Polychloroprene. Landa and Furdik, Bata, Unfiled Application A.P.C. TC 426 (f), June 21, 1941. A carbon disulphide solution of chloroprene is subjected to emulsion polymerization at pH 9.5-10.5. The resulting latex is stabilized with dibenzothiazol disulphide.

Chloroprene Copolymers. I. G. Farbenindustrie, A. G., Konrad, et al., Unfiled Application, TC 1086 (a). Le 28, Hutz & Joslin files, A.P.C., New York Office, June 6, 1934. Excess chloroprene is polymerized with vinyl chloride in solution or emulsion to form a highly plastic benzene soluble polymer. (Reduction to practice of this invention was ordered abandoned in 1938.)

Butyl Rubbers

Modifiers. M. Otto, I. G. Farbenindustrie, A. G., A.P.C. Pending Application Serial No. 275,323, May 23, 1939. A fourfold effect of addition of from 0.1 to 1% of isobutyl alcohol, sulphuric-, nitric-, caproic-, trichloroacetic acids, formaldehyde, phenol, cresol in the boron fluoride catalyzed polymerization of isobutylene with 5 to 40% butadiene at −130 to −140° C. is disclosed: (1) higher molecular weight, (2) higher reaction rate, (3) less catalyst requirements, (4) complete conversion. An interpolymerization product (25% butadiene) compounded with 5% stearic acid, 20% carbon black, 10% zinc oxide, 5% sulphur, 1.5% accelerator, vulcanized 50 minutes at 150° C. possesses: tensile strength, 166 kg./cm.^{2} (2360 lbs./sq. in.); elongation, 936%; recoil elasticity, 12; Shore hardness, 65 at 20° C. Molecular weights, modulus at 200 and 500% elongation, tensile strength, elongation are tabulated for copolymers containing from 25 to 50% butadiene. These percentages probably represent input rather than ratio of comonomers in Butyl rubber.

Polyisobutylene

Polyisobutylene Compounding. I. G. Farbenindustrie,

[1] Classified and abstracted by the Office of Assistant Deputy Rubber Director for Research and Development of Synthetics. Polymer Research Branch, C. S. Fuller, Chief.

[2] Present address, Armstrong Cork Co., Lancaster, Pa.

A. G., Unfiled Application, German Application I 67,382 IVc/39b, June 10, 1940. TC 1199. Compounding polyisobutylene with amorphous silicic acid serves to adapt the product for insulating purposes.

Other Diolefin Copolymers

Butadiene Copolymers. Maximoff, A.P.C. Serial No. 219,604, July 16, 1938, and No. 220,011, July 19, 1938. Disclosure is made of copolymerization of butadiene with monovinyl acetylene and with myrcene, phellandrene, terpinene, Methyl-isopropenyl dihydrobenzene. Rubber-like products are being obtained.

Rubber-Like and Plastic Masses

Resinification of Synthetic Rubbers. Greth et al, A.P.C. Pending Application Serial No. 238,166, November 1, 1938. Isomerization of synthetic rubbers results from treatment with phenols at super-atmospheric pressures in the absence of air or oxygen.

Polystyrene

Mixture of Polystyrene with Natural and Synthetic Rubber, Muller et al, A.P.C. Pending Application Serial No. 412,892, September 29, 1941. 1% of a high molecular polystyrene in the form of a polystyrene-rubber batch is added to a mixture of 20% synthetic and 40% reclaimed natural rubber which latter is difficult to calender. Calendering and extruding qualities are improved. Neat and smooth surfaces of sheets and extruded tubes are obtained on vulcanization in the absence of a mold.

Butadiene-Styrene Copolymers of High Styrene Content. Konrad et al, A.P.C. Pending Application Serial No. 334,574, May 11, 1940. A copolymer of equal parts by weight of butadiene and styrene (70% conversion) possesses less tensile strength, the same hardness (degree Shore), about equal elongation, modulus, and elasticity at 20 and 70° C. as a 4:1 copolymer. Plasticity and masticating behavior are superior to the standard product.

Polystyrene Coatings. I. G. Farbenindustrie, A. G., German Application I 63,701/39a, March 2, 1939. (Du Pont File, Alien Property Custodian). TC 1276. It has been found that the flexibility of polystyrene is improved by storing the product coated therewith at elevated temperatures, but below the decomposition point.

Plasticizers from Lower Styrene Polymers. Fides, Ges. f. Verwertung von gewerbl. Schutzrechten, U. S. Patent Office, Abandoned Files Serial No. 285,987. Di to tetra styrene is obtained by distilling gradually monomeric styrene into boiling decalin to which 10-20% (by weight of styrene) of floridin or dehydrated meta titanic acid may be added. The lower styrene polymers possess high dielectric strength and softening properties and are suggested as plasticizers in electric insulating materials and as pressure equalizing media in long-distance submarine telephone cables.

Polyvinyl Esters

Procedure for Increasing Molecular Weight. Kalb, A.P.C. Pending Application Serial No. 363,569, October 30, 1940. Polymerization in the absence of a solvent is interrupted after 40% conversion. The mixture is diluted with monomer to 20% polymer concentration and heated gradually from room temperature to about 100° C. over 20 hours. A more viscous product is obtained than when polymerization is not interrupted.

Decreasing Solubility of Vinyl Esters. Herrmann, et al., A.P.C. Pending Application Serial No. 374,298, January 13, 1941. Addition of 0.1 to a few per cent. of vinyl-crotonate to mass and emulsion polymerization of various vinyl esters causes rather violent reaction and formation of insoluble and infusible polymers. Lesser percentages of vinyl crotonate cause only reduction of solubility and swelling of polyvinyl esters.

Heat Stabilization of Polyvinyl Esters. Fikentscher, A.P.C. Pending Application Serial No. 389,417, April 19, 1941. Polyvinylchloride coagulum is washed with sodium carbonate, and diphenylthiourea is imparted in varying amounts. Thin films of polymer, when heated to 155° C. for two hours, will not discolorize.

Natural Rubber

Making Natural Rubber Solvent Resistant. Compargnon et al., A.P.C. Pending Application Serial No. 437,597. Working of natural rubber on mills with small proportions of maleic anhydride, styrene, acrylic acid in the presence or absence of peroxide catalysts reduces swelling in solvents and renders rubber stiffer.

Concentration of Latex. d' Angremond, et al., A.P.C. Pending Application Serial No. 326,300, March 27, 1940. To plantation latex soybeans or other seeds are added. After eight hours the maximum moisture has been absorbed. The concentrated latex is stabilized by ammonia.

Vulcanization with Active Phenol Formaldehyde Resins. Wildschut, A.P.C. Pending Application Serial No. 357,662, September 20, 1940. 50 parts of phenol alcohol are mixed with 100 parts *Hevea* rubber or Perbunan and vulcanized two hours at 155° C. Physical properties of the product are given.

Conversion of Rubber to Resin. Greth, et al., A.P.C. Pending Application Serial No. 238,166, November 1, 1938. Isomerization of natural and Buna-type rubbers to resinous bodies is caused by phenol in the presence of boron fluoride or boron fluoride acetic acid complex in the absence of air and water and at temperatures higher than the boiling point of the phenol applied (super-atmospheric pressures).

Cellular Rubber. Pagnon, A.P.C. Pending Application Serial No. 305,042. Prevulcanized rubber slabs are subjected in fluid-tight container at room temperature to unspecified carbon monoxide pressure. After diffusion and inflation has occurred, nitrogen of unspecified pressure is admitted, which penetrates readily into the gas spaces and is retained after carbon dioxide has diffused by osmosis. The product may be subjected to a complementary vulcanization in a finishing mold. 50% more rubber is treated in half the customary time with half the previously applied pressure.

Cellular Rubber. Pagnon, A.P.C. Pending Application Serial No. 306,197, November 17, 1939. A cheaper process of manufacturing cellular rubber consists in applying two types of rubber—natural or synthetic—one of sufficient plasticity and slow curing behavior to prevent bursting of the cellular structure, the other furnishing the required resiliency. Higher plasticity is effected by depolymerizing which, in turn, involves slower vulcanization rates.

Rubber Powders. Van Delfsen, Serial No. 247,986, Abandoned Files, U. S. Patent Office. To a latex is added a vulcanizing agent, an accelerator, a latex stabilizer. The ensuing reaction is permitted to proceed to the point where on desiccation a film of substantially no tensile strength is obtained, and until on coagulation no longer a coherent coagulum is formed. The rubber is separated from the serum at this point and disintegrated.

END USES

Adhesives

Adhesive. Bock, (I. G.), A.P.C. Pending Application Serial No. 378,411, February 11, 1941. 16 parts of Buna N dissolved in 62 parts of methyl ethyl ketone and 22 parts of ethanol give a valuable adhesive.

Adhesives. Daur, et al., (I. F.), A.P.C. Pending Application Serial No. 386,860, April 4, 1941. A styrene solution of a rubber or resin is stabilized by small amounts of low boiling inhibitors (amines, etc.). Prior to use a peroxide is added, the adhesive solution spread, and heat applied or left at room temperature for two days. A very strong bond between polyisobutylene and sheet metal is obtained.

Coatings

Solvents for Synthetic Polymers. Kummel, A.P.C. Pending Application Serial No. 279,151. Methylisopropyl benzene mixed with small proportions of esters and ketones is a cheap solvent for synthetic chlorinated rubbers.

Elastic Coatings of "Thiokol" Rubber on Metals. Silesia, U. S. Patent Office, Abandoned Files Serial No. 251,694. "Thiokol" rubber is compounded with small quantities of substances possessing one negative group. The product adheres well to metal surfaces.

Wire and Cable Insulating Material

Electric Insulating Materials. Muller (Siemens), A.P.C. Pending Application Serial No. 412,892, September 29, 1941. Synthetic rubber is milled on hot rolls with 25 to 100 parts of high molecular polystyrene (Polystyrene EF) with an E value of 100 or higher, and the latter possessing a softening point above the vulcanization temperature to be applied. This is followed by cold milling to make the mixture plastic and flexible. The products can be worked into smooth sheet and wire coverings.

Polyisobutylene-Base Electric Insulating Material. Muller, A.P.C. Pending Application Serial No. 216,606, June 29, 1938. Cumarone, polystyrene, or similar aromatic resins of melting point 100° C., preferably above 125° C., are milled in ratios of 1:2 to 2:3 with polyisobutylene. The resulting product possesses proper electrical, processing properties, water impermeability, and its shape is only slightly impaired at high temperatures.

Plasticizers for Insulating Materials. Deutsche Hydrierwerke, German Application No. D 78,600 IVc/13b, August 3, 1938. A.P.C. TC 263 (a). Esters or amides of fatty acids (e.g., lauric) and cyclic or acyclic alcohols or amines containing oxygen, sulphur, or nitrogen in the hydrocarbon radical (e.g., beta diethyl amino-ethanol) are softeners of excellent electrical qualities and can therefore be applied in insulating materials.

Plasticizers. Deutsche Hydrierwerke, German Application No. D 78,711 IVc/39b TC 263 (e). Liquid unsaturated mineral oil fractions (iodine No. 83 molecular weight approximately 430) are suggested as plasticizers in cable insulating materials.

Plasticizers. Martens to Fides, U. S. Patent Office, Abandoned Files, Serial No. 285,987. Methods for the preparation of di-, tri-, tetrameric styrene are disclosed. These products are softeners of high dielectric strength, suitable, among others, as pressure equalizing compounds in submarine cables.

Fabrication of Tires

Rayon Cords. Comptoir des Textiles Artificiels, French patent No. 804,128, Alien Property Custodian. TC 1085, March 21, 1936. Viscose rayon cords are made from viscose charged with phenol-formaldehyde and phenol-urea resins. Rubber adheres very well to the cords when so treated.

Triton Wetting Agents

FIVE types of wetting agents and detergents, called Tritons, have useful application in compounding rubber latices and in the textile and leather industries. Triton W-30, the sodium salt of an aralkyl ether sulphate, is a clear straw-colored liquid supplied as a 20% concentration in water solution. Anion active, it is effective in neutral, acid, and alkaline solutions. Surface tensions are not greatly changed by varying the pH, and they remain low on dilution. Triton W-30 is claimed to be rapid and thorough in its wetting activity and to be an excellent surface and interfacial depressant. It is insoluble in oils.

Triton NE, a straw-colored water solution of 30% concentration, is an aralkyl polyether alcohol. It is non-ionic and compatible with both cation and anion active materials. Surface active properties of this penetrating and dispersing agent are retained in strong acids, salts, and bases. In the 100% form it is supplied as Triton X-100.

Triton 770, an aqueous solution containing 20% of an aralkyl ether sulphate, is stable in neutral and alkaline solutions even when heated, and in acid solutions unless heated at a pH below 3.5. It will emulsify oils and greases and suspend solid particles. Although Triton 770 foams readily, it does not form a heavy lather and can be used in many places where ordinary soap cannot. Its spreading properties are reported to be good. Tests showed marked lowering of surface and interfacial tension.

Triton K-60, an aqueous dispersion of a quaternary ammonium salt, is supplied as a paste at 25% solids. A cation active compound, it is stable in solutions of strong acids and is not precipitated in hard water or by waterproofing agents. Triton K-60 retains its activity in concentrated acids and salts. Rohm & Haas Co., Washington Sq., Philadelphia 5, Pa.

SHIPMENTS OF KAOLIN OR CHINA CLAY IN 1943 totaled 929,437 short tons, value $8,087,322, against 946,503 tons, value $8,037,233, in 1942, according to the United States Department of the Interior. Mine shipments were reported from 13 states. Georgia, the leading producer, contributed 79% of the 1943 national output. The paper industry consumed 59%, refractories 16%, pottery 9%, and the remainder was used in rubber and other products.

California Government Synthetic Rubber Plants

Al Hill

Fig. 1. Production Steps—Pacific Coast Government Synthetic Rubber Plants

COMPLETION of the building and achievement of full operation of the government's synthetic rubber plants on the Pacific Coast was officially marked on Thursday, April 20, with a press preview of the six operational plant units, as arranged by the Los Angeles Chamber of Commerce with the approval of the War Department, the Defense Plant Corp., the Rubber Reserve Co., and the office of the Rubber Director. These plants, which cover 250 acres of ground, are located on the Los Angeles plain between the mountains and the sea.

Development and Organization of Pacific Coast Plants

The California synthetic rubber project is a highly integrated chemical process in which the individual plants operated by six different companies, all in the Los Angeles area, are linked together in a continuous production flow from petroleum, benzene, and alcohol through butadiene and styrene to make Buna S or GR-S synthetic rubber. The accompanying simplified flow sheet (Figure 1) illustrates in a very general way from where, with what, and by whom the synthetic rubber is produced. These plants are situated in a triangle, two lengths of which are approximately 17 miles long (it is that distance from the Southern California Gas Co.'s butadiene plant—in the shadows of the Los Angeles City Hall in the downtown area) to the Standard Oil Co. of California's butadiene plant at El Segundo, some 17 miles to the southwest and only a mile or so from the Pacific Ocean. The other plants are about five miles east of Standard's El Segundo plant and comprise the short side of the triangle along approximately that distance.

As revealed during the inspection of these plants and also as indicated in Progress Report No. 5 from the Office of the Rubber Director, butadiene is produced from petroleum by the Standard Oil Co. of California by the Houdry process, at a rate of 15,000 short tons a year; by the Shell chemical division of the Shell Union Oil Corp. by the dehydrogenation of normal butylene, at a rate of 25,000 short tons a year; and by the Southern California Gas by cracking naphtha or low-grade gasoline. The C_4 hydrocarbons from the Southern California Gas plant consist mostly of butane, butylenes, and butadiene and are sent by pipeline to a purification unit operated by the Shell company. Southern California Gas and Shell in this last-mentioned combination of units have a rated annual capacity of 30,000 short tons of butadiene.

The styrene plant operated by Dow Chemical Co., the first of the California units to go into production in June, 1943, has an annual capacity of 25,000 short tons of this other major constituent of GR-S.

The copolymer units, of which there are three, each having a capacity for the production GR-S at a rate of 30,000 long tons a year, are operated jointly by the Goodyear Synthetic Rubber Corp. and the United States Rubber Co., Synthetic Rubber Division.

Butadiene Production

SOUTHERN CALIFORNIA GAS CO. AND SHELL OIL CO. In June, 1942, the Defense Plant Corp. requested Southern California Gas to convert its Aliso St. gas works, which since the introduction of natural gas in Los Angeles in 1927 had been used merely as a standby facility, to the manufacture of butadiene. After an exhaustive program of necessary research on the processes involved, actual construction began in September, 1942, and the converted plant began production in June, 1943. The oil distillate for this process is obtained from the refineries of Shell, Associated, Wilshire, Texas, Union Oil, General

Fig. 2. Heat Exchangers at Southern California Gas Co. Plant

Carroll Photo Service

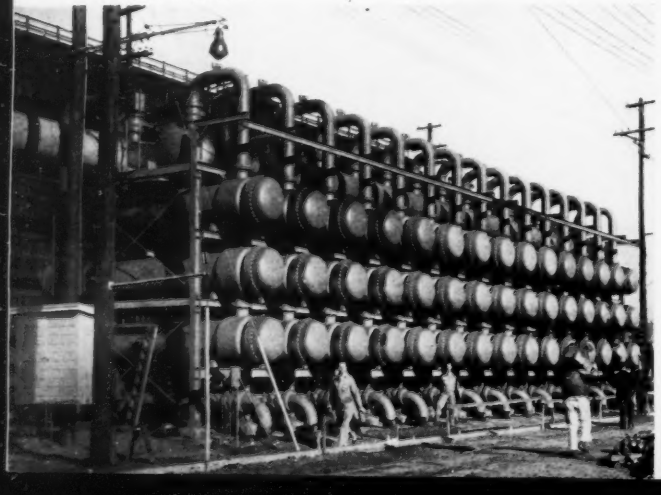
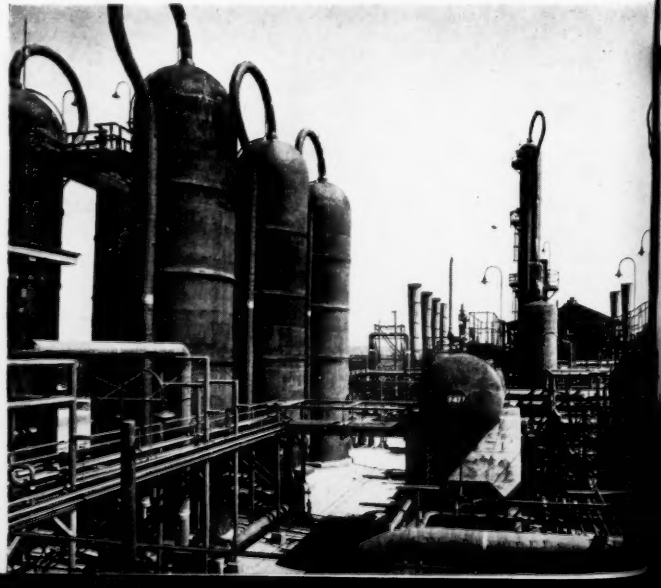
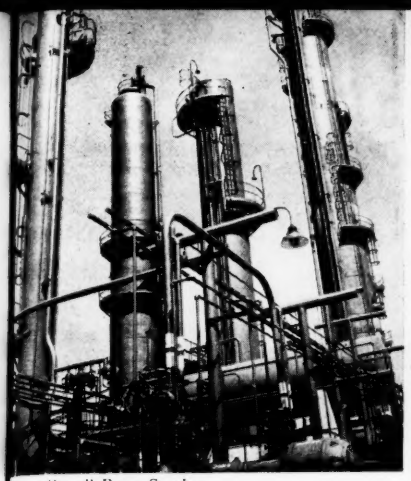


Fig. 3. Acetylene Polymerization Unit at Shell Chemical Plant for Removing Undesirable Acetylenes from Hydrocarbon Stream

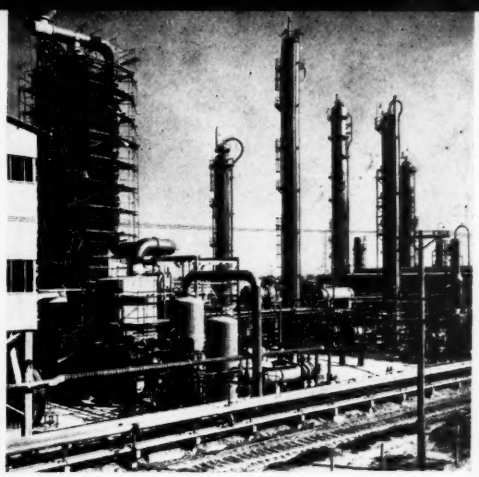
Jerry A. Anson





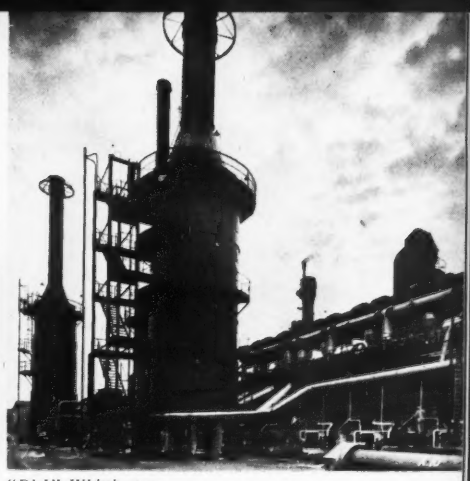
Powell Press Service

Fig. 4. Distillation Towers of Extraction Unit at Shell Chemical Plant



Jerry A. Anson

Fig. 5. Catalytic Dehyrogenation Unit for Producing Butadiene from Butylene at Shell Chemical Plant



"Dick" Whittington

Fig. 6. Furnaces at Left, Reactors at Right in the Standard Oil of California Butadiene Plant

Petroleum, and Standard Oil of California. The oil is cracked and converted to butadiene and blend stocks by means of high temperatures and superheated steam. Traces of butadiene are removed from the liquid products in a stripping plant; then these liquid products and water are retained long enough in tar separators to effect a separation due to their difference in gravity. The liquid products are now pumped to the dehydration plant, and the water, containing traces of liquid products not removed by the tar separators, enters flotation cells where by absorption of the liquid products on minute bubbles of residue gas, the remaining liquid products may be also removed from the water and pumped to the dehydration plant. The water leaves the flotation cells and is pumped to heat exchangers to be cooled. The entire system is closed to prevent the escape of objectionable odors. A view of the heat exchangers at this plant, which were installed last year because of considerable local comment about odor from the Gas company's butadiene plant, are shown in Figure 2.

The crude butadiene and butylenes or C_4 fraction are recovered by conventional gas absorption methods and sent by pipeline to the Shell Chemical Co. for separation and purification.

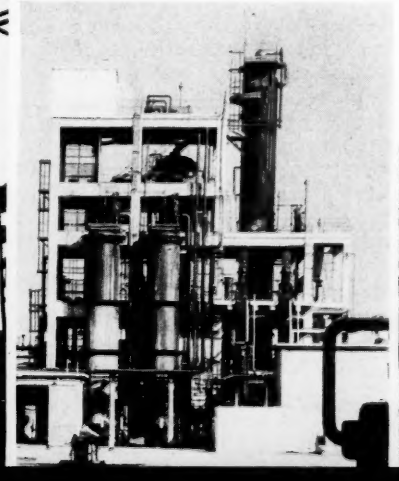
SHELL CHEMICAL DIVISION OF THE SHELL UNION OIL CORP. The Shell Union Oil Corp. had constructed and placed in operation a butadiene plant in Houston, Tex., even before Pearl Harbor and had conducted intensive experimentation on butadiene production before this at its Emeryville, Calif., laboratories. Immediately after Pearl Harbor, Shell offered the results of its experimental work to the government and subsequently, under agreement with Rubber Reserve Co., began construction, in September, 1942, of butadiene units of the California synthetic rubber project.

The Shell company's butadiene units are operated partially in conjunction with the Southern California Gas butadiene plant and partially in conjunction with the Shell refinery in the same area. The material from Southern California Gas containing mostly butadiene and butylenes has present also in this mixture some acetylene which must be removed. This action takes place in the acetylene polymerization unit illustrated in Figure 3, after which the remaining butadiene-butylene mixture is fed into an extraction system, a view of which appears in Figure 4, where the butadiene is separated from the butylene. The butylene is then combined with a butane-butylene mixture from one of the Shell refineries, and this combination of materials from Southern California Gas and Shell flows into a "cold acid" unit where isobutylene is extracted, using sulphuric acid as a catalyst. The butanes and normal butylene are now put through another extraction unit to remove the butanes. The normal butylenes are then converted into butadiene by a catalytic dehydrogenation process (this unit is in Figure 5), and this crude butadiene and other products are combined with the now acetylene-free butadiene from the plant operated by Southern California Gas, and all of this crude butadiene is purified in the butadiene extraction unit. The pure butadiene is then piped to the copolymer units for use in the production of GR-S.

STANDARD OIL CO. OF CALIFORNIA. Research work on butadiene production methods was begun in July, 1942, in Standard Oil's laboratories at Richmond, Calif., and as a result, construction was started in March, 1943, on a plant to produce butadiene by the Houdry process. The plant was built for DPC and is being operated by Standard

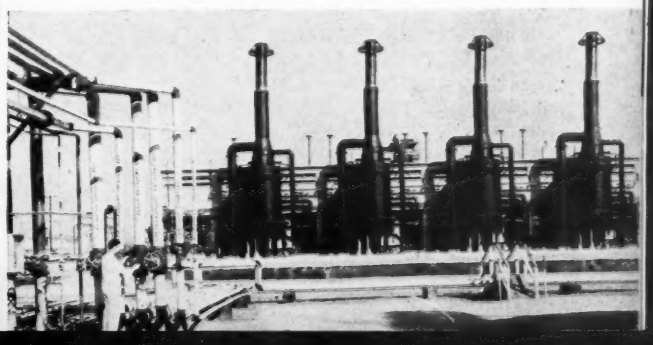
Fig. 7. Extraction Towers in Standard of California's Butadiene Plant: *Left to Right:* Extractor, Butadiene Rerun Column, Depropanizer

"Dick" Whittington



(*Left*) **Fig. 8. Ethyl Benzene Unit at Dow Chemical Plant Where Ethylene and Benzene Are Combined**

Fig. 9. Ethyl Benzene Dehydrogenation Unit at Dow Chemical Plant: Styrene Is Obtained from Ethyl Benzene in These Furnaces



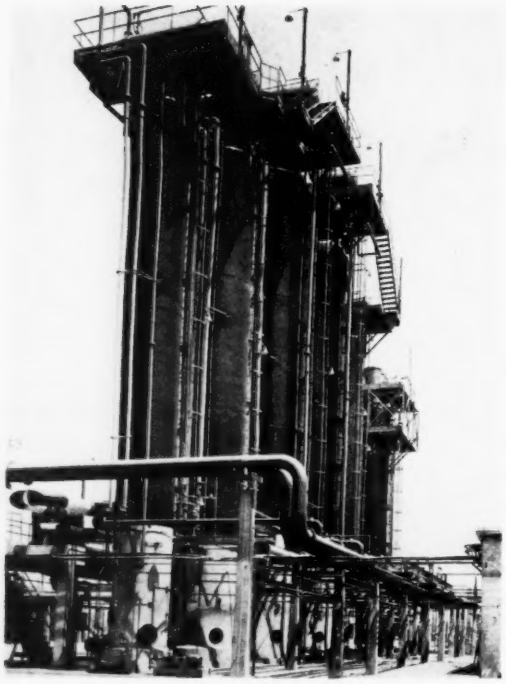


Fig. 10. Distillation Towers at Dow Chemical Plant Used for Purifying the Crude Styrene

for Rubber Reserve.

The manufacture of butadiene by the Houdry process starts with butane obtained from Standard's El Segundo refinery. The butane is dehydrogenated in reactors in two stages. Untreated butane, butylene, and lighter gases are obtained from the first stage. The butane and butylene portion is concentrated before entering the second stage in which the butadiene is produced. A view of furnaces and reactors at this plant is shown in Figure 6. The butadiene is separated and purified in the extraction equipment shown in Figure 7 before delivery to the copolymer plants.

Styrene Production

Dow Chemical Co. The styrene made in the plant operated by the Dow Chemical Co. is produced by a process developed by this company after many years of research aimed toward finding a low-cost method for large-scale production of this chemical. Construction of this plant was begun in September, 1942, and in June, 1943, the first styrene was produced.

The styrene is made in a group of small units, each an integral operating section designed to manufacture certain chemicals independently of the other units. From the wine industry of California, Dow receives 15,000 gallons of ethyl alcohol a day. This is used to manufacture ethylene, which is then piped to the ethyl benzene plant, where the ethylene is combined with benzene obtained mostly from the Kaiser Fontana California coke ovens to produce ethyl benzene. A view of the ethyl benzene unit appears in Figure 8. In a third unit the ethyl benzene is processed in the presence of catalysts and at high temperature to obtain crude styrene. The dehydrogenation unit is illustrated in Figure 9. The styrene is then passed to a fourth unit, shown in Figure 10, where it is purified by distillation and finally precooled to prevent premature polymerization and solidification. The final product, which is better than 99% pure styrene, is piped to the copolymer plants to be combined with the butadiene to form GR-S.

GR-S Plants

Goodyear Synthetic Rubber Corp. and United States Rubber Co., Synthetic Rubber Division. The three standard polymerization plants with a rated annual capacity of 90,000 long tons of GR-S, are operated by the Goodyear Synthetic Rubber Corp. and U. S. Rubber, Synthetic Rubber Division. The general features of design and operation of this type of plant were described and illustrated in the August, 1943, issue of India Rubber World, pages 457-460, and will not be repeated here.

The Pacific Coast Rubber Industry

The completion of this California synthetic rubber project places the Pacific Coast area in a self-sufficient position as far as rubber and rubber products are concerned. The major rubber companies, all of which have factories in Los Angeles, together with the other Pacific Coast rubber manufacturers will consume the output of GR-S rubber in making all types of finished products, from conveyer belts to tires, for use by the West Coast's expanding industries. Today the rubber industry ranks as one of Los Angeles' nine predominant industries and has played an important part in furnishing the community with an economic diversification that has given it a balanced growth.

Computing the Cost of Steam Leaks

ALTHOUGH leaking steam usually issues through a crack or irregular opening, in general practice steam leaks are discussed in terms of the round hole. In computing the amount and cost of leaking steam the diameter of the hole is a basic figure. The following table based on 100 pounds' pressure and steam valued at 50¢ per thousand pounds is of value in estimating the cost of steam leaks.

	Cost of Leaking Steam		
Size of Opening, Inch	Pounds of Steam Wasted per Month	Total Cost of Leak per Month	Total Cost of Leak per Year
½	835,000	$417.50	$5,010.00
⅜	470,000	235.00	2,820.00
¼	210,000	105.00	1,260.00
⅛	52,500	26.25	315.00
1/16	13,200	6.60	79.20
1/32	3,400	1.70	20.40

A useful rule in computing the costs of leaks is: "Square the diameter of the opening in inches; multiply the result by the absolute steam pressure in pounds per square inch; multiply that product by the cost of the fuel in dollars per ton; and multiply this figure by 0.018."

The final figure is the cost of the leak per day in dollars. This rule is based on Napier's well-known formula for finding the weight of steam flowing per second through a given orifice into the atmosphere. This is accomplished by multiplying the area of the orifice in square inches by the absolute steam pressure in pounds per square inch and dividing the result by 70.

The foregoing rule for computing the cost of steam leaks is based on the assumption that one pound of fuel will evaporate six pounds of water into steam. Consequently corrections can be made for higher or lower evaporation as desired. In many modern plants more than six pounds of steam are evaporated by one pound of fuel. The resultant computation can be corrected by multiplying the final result by six and dividing the answer by the actual evaporation in pounds of steam per pound of fuel.

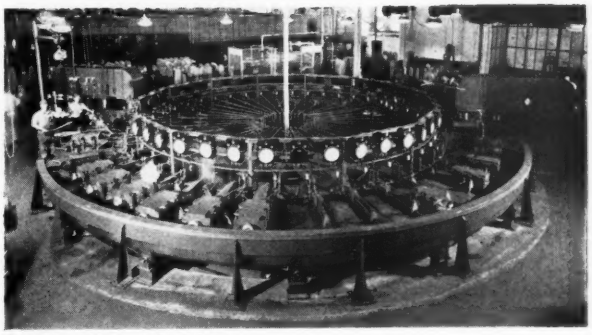
Rubber Cuffs Increase Efficiency of Airplane Propellers

D. C. Sanford[1]

THE modern trend to higher and higher horsepower aircraft engines has materially increased the cooling problems in such equipment. This cooling becomes particularly important during warm-ups and fast climbs to prevent cracking of spark plugs and warping of cylinder heads.

The Hamilton Standard Propellers Division of United Aircraft Corp., at East Hartford, Conn., recently installed an unusual machine for curing rubber fairings (cuffs) on propeller blades to assist in this cooling problem. These fairings are cured on the propeller at the hub end and tend to extend the general contour of the propeller from tip to hub, thereby pulling more air into the engine cowling and securing materially increased cooling in many air cooled engine installations.

Propeller blades fitted with these fairings have also been found advantageous when used with water cooled engines. In many installations they have additional aerodynamic advantages which step up plane speeds at high altitudes.



Hamilton Standard Propellers

"Merry-Go-Round" Curing Press for Neoprene Cuffs on Airplane Propeller Blades

Description of the Rotary Curing Press Used

The machine used at the Hamilton plant consists of a rotary "merry-go-round" curing press 40 feet in diameter mounted on rollers and revolving on a concrete foundation. The outer rim of the turntable is flat and divided into 42 separate sectors. Each of these sections carries a half-ton mold into which the blade fairing assembly is inserted for curing. Each sector has its individual system of air, steam, water, and electricity and is automatically controlled by the Bristol recorder controllers and cam-operated water and steam valves. Supply lines are brought in through the center of the turntable by swing joints and slip rings.

The 42 Bristol Monoset Model 5040-M free-vane air-operated recording pressure controllers revolve with the turntable and control the curing temperatures indirectly through control of the steam pressure in each mold. The instruments provide an accurate record of the curing pressure and also a record of the length of time during which both the steam and the water are kept on the molds. Records are kept on 12-inch, 24-hour charts with a range of zero to 100 pounds per square inch. The instrument control mechanism is of the throttling type in which a thin vane is floated between two jets of air at a pressure of 15 pounds per square inch. The back pressure of air caused by this system operates through a pilot valve to position a diaphragm steam valve and maintain a predetermined pressure in the curing molds. Half-inch normally closed valves of the throttling type with diaphragm operators are installed in the steam line to each mold.

Operation of the Press

The machine cures simultaneously two sets of 21 blades each and is revolved in a clockwise direction by a 14-inch air cylinder advancing one blade sector every 12 minutes. Each mold starts at a loading station, moves to a 100-ton gap-type Farquhar hydraulic press, moves through a steam heating and water cooling cycle, and is unloaded. The heating cycle takes 2½ hours, and the cooling cycle 1½ hours. The 100-ton presses are set up at opposite sides of the turntable so that each blade is cured in one-half revolution of the "merry-go-round."

The cuffs consist of split sections of sponge rubber which have been previously cured in sections which fit the metal blade and with outer contours which provide highest cooling efficiency. These cuffs are fitted on the blades and covered with hard sheets of polished neoprene. The built-up section is then fastened to the blade in the curing presses.

At the start of the operation the inside of the mold is coated with wax, and the steam is turned on. A blade with the rubber fairing attached is then inserted into the mold, which is loosely bolted together. A turn of the table carries the mold under one of the hydraulic presses which closes under pressure. Excess rubber is forced out; the mold bolts are tightened, and the blade moves to the next position. A canvas and wool insulating blanket is thrown over the blade to protect its surface and to conserve heat. The table then carries the mold through progressive steps to complete the heating cycle under controlled steam pressure. At the end of the heating cycle the steam valve is turned off by means of push rods operated by cams located in the outer periphery of the table. Refrigerated water valves are opened in a like manner, and the cuffs are cooled until they reach the unloading station 180 degrees from the starting point.

The mountings of the rotary table are on steel springs that create a slight "give" to bring the table into contact with the lower platen of the press while the mold is being cooled. When the pressure is released, the table lifts and clears the lower platen by about $\frac{1}{16}$-inch. Six electro lift worm drive hoists are mounted over the table to open and close molds.

The machine provides continuous, uniform molding of the rubber fairings with a minimum of handling and has broken a former bottleneck in this operation. Design and construction of this equipment was carried on by the L. Heres DeWyk Co., Ansonia, Conn.

[1] Engineer, Bristol Co., Waterbury 91, Conn.

EDITORIALS

Political Maneuvering Might Jeopardize Rubber Program

IT WOULD probably be too much to expect that the government's rubber program would be entirely free from attempts to use its achievements or deplore its failures, according to the political convictions of those looking for campaign material during a presidential election year. In fact there are already several instances where statements either as made or as interpreted by various writers definitely tend to give the impression that the tire shortage and the rubber shortage have been so completely eliminated that a return to prewar unrestricted use of rubber products was only a few weeks off. As those in the rubber industry know, this is far from the truth and might seriously interfere with the future administration of the wartime rubber program.

During the month of May it was necessary for Rubber Director Dewey to emphasize before the Senate Judiciary Subcommittee investigating the liquor situation that the synthetic rubber program must not be interfered with and that any arbitrary reduction of the present allocations of industrial alcohol for the program would seriously jeopardize it. Tire conservation material has been prepared and distributed by the War Advertising Council and the Office of War Information, and a series of news releases is now being distributed by The Rubber Manufacturers Association covering ways in which to prolong tire life. Despite all this, newspaper and magazine headlines are at this time playing up statements, such as "New Tires by Fall Forecast for Nation's A Card Drivers," after interviews with OPA and WPB officials, and in other statements are implying that since the allotments of new tires for civilians have been raised for May to take care of cases of extreme need, a plentiful supply of tires will soon be available for everybody. Actually the total new passenger-car tires available in 1944 may be from 15 to 18 million, which is probably less than one-fourth of the real 1944 replacement needs. In contrast with these overly optimistic reports, representatives of the War Production Board's labor section almost on the same days the reports were published were in conference with labor and management leaders in the tire production centers looking for ways and means of increasing lagging tire output.

Another instance of a proposed action that would be detrimental to the tire conservation program is the report that the Office of Defense Transportation and the Interstate Commerce Commission are actively considering raising the 35-mile wartime speed limit to 45 miles per hour since the 35-mile limit is allegedly not being observed by the average motorist, and a saving in bus and truck equipment as well as manpower would result. The very much shorter tire life at 40 and 50 miles per hour, particularly in the hot summer months, has been confirmed again and again, and to encourage the increased consumption of truck and bus tires, the manufacture of which still demands appreciable amounts of natural rubber from our short supply, could not be considered as an action taken with a complete realization of all the facts.

What does this all add up to? It means that there is a real need of all those in the industry who know the facts in these various cases to continue to do missionary work among their friends, neighbors, and business associates and possibly even with local and national publications to prevent misconceptions and ill-advised actions from endangering the rubber program during its next critical six months, even though these particular months also happen to be those before the coming election.

Precedent Established by Seizure of Standard Oil Patents?

IT WAS announced on May 25 that the Standard Oil Co. of New Jersey had been ordered by the Alien Property Custodian to surrender to the government blocks of securities which were jointly sponsored, prior to the war, by Standard Oil and I. G. Farbenindustrie, I. G., and 675 patents and about 100 applications for patents. The patents and applications involved in this action cover a number of important processes for the refining and treatment of crude oil, for making of synthetic gasoline and lubricating oil from coal, peat, natural gas, and other materials except crude oil, and for making special chemical products, including synthetic rubber, it was reported. Special agreements for the use of the patents in the production of synthetic rubber and in catalytic refining are in force, between the Alien Property Custodian and the Standard Oil Co. in order that the best possible use of the processes covered by the patents could be made during the war emergency, but the Standard company has always maintained that it was the sole owner of these properties since 1939.

If the suit to recover these stocks and patents which Standard Oil plans to file immediately in Federal District Court is decided against this company, does this action not establish a precedent which may have far-reaching effects on the course of the relations of American business firms with foreign firms both now and in the future? Are all companies who are now operating under patents bought and paid for before the present war from citizens or companies of Axis nations and now vested in the Alien Property Custodian to be denied the return of their property after the war? In the future what assurance has any American business firm that property in the form of patents purchased from what at any given time was a citizen or firm of a friendly nation, will be a total loss by virtue of the government taking *permanent* possession of this property when and if this friendly nation becomes an enemy nation?

The answers to these and many other similar questions which may be argued in the forthcoming court suit should be of considerable value to many American firms.

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STATEX A
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Scientific and Technical Activities

Agricultural Research Developments Told at Chemurgic Conference

THE tenth annual chemurgic conference of the National Farm Chemurgic Council at St. Louis, Mo., March 29 to 31, covered a wide range of topics presented in about 40 papers by eminent research and technical experts.

M. C. Teague, manager of the new products department of the United States Rubber Co., envisaged a revolutionized postwar standard of living through the development of scientific products used on the battle fronts, which may later be adapted for civilian comfort. Products mentioned included an improved signal wire, developed from rubber latex, which may be used for electric wiring in homes; and a plastic foam insulating material of low cost that can be molded or cast in any desired shape and is inert to moisture, oil, and gasoline, and weighs only 1½ pounds per cubic foot as compared to 12 pounds for cork.

Uskon, a conductive rubber now employed to control temperature of guns on planes and as a deicer on propeller blades, may be utilized for heating homes. An entire house may be warmed by radiation from a film of conductive rubber on the walls. Other materials shown by Dr. Teague included an artificial leather made from elastic fiber; "Kuron", an elastic fabric of convincing durability used in gas masks, respirators, and health articles; and a roadway expansion joint for use in filling the spacing gap between concrete slabs, which is made from rubber-like materials derived from farm products.

J. H. Du Bois, of the General Electric Co plastics department, discussed several types of plastics including vinyl, polystyrene, and the elastomers. He predicted lower prices and increased civilian use of them after the war.

H. T. Herrick, director of the Northern Regional Research Laboratory, United States Department of Agriculture, Peoria, Ill., announced the development of an improved type of cotton cord for heavy-duty tires for which rayon has been used. The cotton cord was produced through service tests of many varieties of cotton and chemical treatments and mechanical modifications in physical structure of the selected variety. New processes for the production of starch from wheat, and Norepol, a rubber substitute, were also developed by the Northern Regional Research Laboratory during the past year.

Mr. Herrick said the production of 2,3-butylene glycol and butadiene initiated by the laboratory was mainly in the pilot stage in 1943. The pilot plant is capable of producing 100 pounds of butadiene a day. Results showed that a yield of butadiene equal to 55.4% of theoretical can be obtained. The purity is 98.5 to 99%. A bushel of wheat or corn will produce about 6.3 pounds of butadiene, somewhat more than the yield by the alcohol process now in operation on a large scale.

Paul Kolachov, technical counsel of Joseph E. Seagram & Sons, Inc., stated that sweet potatoes had been shown to have considerable promise as a source of alcohol and that no unsurmountable difficulties were encountered in using this material.

A paper, "Ethyl Alcohol from Waste Wood by a Modified Scholler Process", by W. L. Faith, Office of Production Research and Development, WPB, and J. A. Hall, United States Forest Service, Department of Agriculture, described the revised procedure which greatly shortens the operating cycle of the original Scholler process. The modified process is designed to produce 11,500 gallons of 190-proof alcohol a day from 220 tons of waste Douglas fir. One hundred fifty pilot plant runs were made covering all major forest species of the United States.

John L. Collyer, president of The B. F. Goodrich Co., said that the problem of adequate supplies of war rubber is being rapidly solved and that the cost of synthetic rubber has been reduced as volume increased. Some has been made at 14¢ a pound, but the average cost for all plants is substantially higher. He also noted substantial improvement in the overall quality of synthetic tires and other products in 1943.

Mr. Collyer estimated potential postwar world rubber capacities at 1,600,000 tons of natural and 1,200,000 tons of synthetic annually. He predicted that world rubber consumption will reach 1,600,000 tons annually within six years after the war's end and stressed the importance of low price in closing the gap between potential world supply and demand. New farm uses for rubber, Mr. Collyer said, will include a rubber floor covering for stables and pigsties to provide sanitary housing for livestock and small pigs, sponge rubber linings for hens' nests to reduce egg breakage, synthetic rubber milking machine tubing and inflations, and rubber linings for silos and water troughs.

Douglas Receives Plastics Research Award

THE John Wesley Hyatt gold medal and a cash gift of $1,000 were presented May 11 to Stuart D. Douglas, head of plastics research, Carbide & Carbon Chemicals Corp., South Charleston, W. Va., for his work in the polymerization of vinyl resins. The award, sponsored annually by the Hercules Powder Co., Wilmington, Del., was made at a luncheon of the Society of the Plastics Industry at the Edgewater Beach Hotel, Chicago, Ill., during the yearly conference of the society. About 1,200 members and guests witnessed the presentation by Carl S. Marvel, president-elect of the American Chemical Society. Rubber Director Bradley Dewey, was the principal luncheon speaker. His talk, "The Synthetic Rubber Program", was illustrated by slides showing the growth of the synthetic rubber program in America.

Dr. Douglas, who was born at Bristol, Vt., September 2, 1897, was graduated from Middlebury College with a B. A. degree in 1919. He received a Ph. D. from the University of Pennsylvania in 1926 and in that year became associated with Carbide & Carbon, where he began experimenting with the polymerization of vinyl resins. The accumulated results of Dr. Douglas's work, in the opinion of the award committee, constituted the outstanding achievement in the plastics industry in 1943. A majority of his inventions have been concerned with controlling the conditions of polymerization so as to yield substantially uniform polymers of high molecular weight. Many of the discoveries, particularly as to polymerization and stabilization, are applicable to polyvinyl chloride as well as to the copolymers of vinyl chloride with vinyl acetate. Increased production of vinyl resins, made possible by Dr. Douglas's 17 years of study and development, has provided strategic materials for wartime manufacture. The use of vinyl resins saved thousands of tons of rubber during 1943.

Plasticized vinyl chloride-acetate copolymer resins are among the elastic plastics now replacing rubber. They are immune to many factors which cause deterioration in rubber and under certain conditions will outlast rubber. Although compounded similarly to rubber, in many instances they are more rapidly and economically fabricated into flexible, resilient, and stretchable finished products. These resins, white, fluffy powders in their natural form, are supplied in this form to the rubber industry and others which have processing equipment for compounding into coating materials and other products. An important use is found in the calender-coating of cloth for Army and Navy needs. Army raincoats, inflatable equipment, and tarpaulins of many types are waterproofed with vinyl plastics. Heavy elastic vinyl plastic coatings on cloth, employed for upholstering tank and aircraft seats, have proved superior to rubber-base artificial leather in moisture resistance, toughness, and flexing life. Floor mats for bombers are made from thick coatings of the same material. Electric wires and cables are protected with non-inflammable, abrasion-resistant extruded coatings of vinyl plastics instead of rubber. Transparent tubing, flexible at temperatures of —50° F., is used as conduits for aircraft wiring. The tubing also serves as water and chemical resistant hose. By the injection molding process transparent terminal insulators for aircraft wiring, grommets, bumpers, and many other products are produced at high speeds and come from the mold completely finished in a single operation.

The utilization of elastic vinyl plastics by rubber fabricators eliminates curing or vulcanizing. The plastic compounds come from the press, extruder, or calender mill as completed products. The handling of the vinyl resins is essentially the same as the handling of rubber. In many processes standard rubber processing equipment may be used with only minor alterations. No extensive employe reeducation is required either when using these plastics.

INDIA RUBBER WORLD *Staff Photo*

Speakers' Table at the Banquet of the Division of Rubber

(*Left to Right*): S. G. Byam (Du Pont), Division Director; C. C. Davis (Boston Woven Hose), Editor, *Rubber Chemistry and Technology;* C. W. Christensen (Monsanto), Division Treasurer; F. S. Conover (Naugatuck), Chairman, New York Group; Walter J. Murphy, Editor, *Industrial and Engineering Chemistry;* W. W. Vogt (Goodyear), Division Director; E. B. Babcock (Firestone), U. S. Assistant Rubber Director; John T. Blake (Simplex Wire), Division Director; B. J. O'Donnell, British Raw Materials Mission; H. I. Cramer (Sharples), Division Secretary

Spring Meeting of Rubber Division, A. C. S., Establishes New Records

IT MIGHT rightfully be said that the spring meeting of the Division of Rubber Chemistry of the American Chemical Society, held in New York at the Hotel Commodore on April 26, 27, and 28, established new records for the Division in the scope and content of the papers presented and definitely in the registration of 1,219, a new high in attendance. The reasons for the phenomenal growth of the Rubber Division might be found in the opening remarks of the Chairman Harold Gray, when he said,

"I cannot pass this opportunity to comment on the miracle that we in the rubber industry have created. I defy anyone to call the designing of processes, of equipment, the construction of 49 new plants, the production of raw materials, and the manufacture of synthetic rubber itself, together with the conversion from natural rubber to synthetic rubber, anything but a miracle. Rubber technologists can be justly proud of the job accomplished on GR-S in the short time allotted to us, but we must not overlook the fact that many others have contributed equally to this tremendous accomplishment, from the men who designed the original raw material processes on through all the intricate steps necessary to achieve the final product—man-made rubber.

"In particular we do pay tribute to the production men in the rubber factories, who, without previous experience, have done a marvelous job in handling synthetic rubber, a new material.

"Even though we can point with pride to our collective accomplishments to date, we still have a great deal to do and we cannot afford to minimize the task remaining before us."

Outstanding Achievements and Course of Future Developments

The papers presented adequately substantiated the chairman's statements as to the importance of the accomplishments of the rubber chemists and technologists and also revealed the magnitude of the research remaining to be done. From the presentation of information on the new synthetic rubber "Lactoprene" by chemists of the Eastern Regional Laboratory of the Department of Agriculture, through the interesting results of the "Electron Microscope Studies of Natural and Synthetic Rubber Fibers" by Hauser and others, the report on milling experiments with *Hevea* and Buna rubbers by Wiegand and Braendle, the relation of structural features of GR-S to physical properties by Kemp and Straitiff, and the use of copper and certain copper compounds to increase output and improve quality of synthetic rubber products by Somerville, the technical sessions began in a manner that gave every indication to those in the audience that they were going to be very glad of their decision to attend this meeting of the Rubber Division.

Papers on the vulcanization and aging of synthetic rubbers by Massie and Warner; Wolf, Deger, Cramer, and deHilster; and Baldwin, Zapp, and Turner were presented. Alkyl phenol sulphides, as discussed by Wolf, Deger, Cramer, and deHilster, showed promise as new accelerators for Buna S and Buna N, but were indicated as being not adaptable to Butyl rubber. Some results of the use of p-tertiary amylphenol disulphide with the copper diethyldithiocarbamate, or Cumate, as previously described by Somerville, were presented in this paper.

Interesting data on the effect of moisture on the curing rate and physical properties of GR-S were given in papers by Rupert and Gage and Wiegand and Braendle. The direct addition of 2.5 to 5% water on the mill was suggested as a means of leveling the curing rate of GR-S of very low moisture content.

Non-black pigments of very fine particle size used in conjunction with carbon blacks were reported to aid the dispersion of the finer blacks, provide a wider choice of physical properties of the finished compound, and generally to be of considerable value when used in this type of combination, according to a paper by Lukens. An improved formulation of GR-S with distinct merit in respect to stress-strain and heat build-up characteristics, containing 15 volumes of zinc oxide, Trimene base, magnesia, and coumarone indene resin was reported in the paper by Jones, who also pointed out the striking effect of the nature and amount of organic acid in Buna S-type rubber on physical properties of the vulcanizate from the standpoint of zinc oxide reenforcement. The advantages of pigment incorporation in GR-S through latex were described by McMahon and Kemp, who emphasized that substantial improvements in stocks and an increase in the productive capacity of present rubber machinery could be realized by this method. A theory to explain the stiffening effect of pigments, such as carbon black in rubber, which sought to extend the compression results on large-scale test pieces to the microstructure in the loaded stock was found to have good agreement with experimental results according to Gehman.

Further information on the value of RPA No. 5 in reducing the high recovery of GR-S after plasticization was given by Neal and Ottenhoff, and studies on the processing behavior of Butyl and Perbunan polymers which indicated that molecular weight distribution and the insoluble gel content, if any, are factors in conjunction with the average molecular weight which determine the processing characteristics of a given type of polymer were reported by Zapp and Gessler.

Other papers discussed physical testing and aging of synthetic rubbers, and considerable interest was exhibited in the paper by Burchfield that explained a rapid method for the identification of natural and synthetic rubbers which can be quickly carried out in the plant or field laboratory.

The properties of mixtures of Buna N rubbers, such as Hycar OR-15 and plasticized polyvinyl chloride (Geon resins), in which a favorable combination of properties was found in a mixture of 75% Hycar OR-15 and 25% Geon #102 were explained by Emmett. The compounding, processing, and "vulcanizing" of vinyl butyral was discussed at some length by Plumb.

The Division Banquet

In keeping with the general tenor of this Rubber Division meeting, the Division banquet, held in the main ballroom of the Commodore on April 27, was a very successful event, attended by about 950 members and guests. No special speaker was featured, but such items as the organ music provided during dinner and exceptionally good entertainment in the form of several acts of vaudeville following dinner were all that was necessary to insure the enthusiastic reception by the Division members and their guests of this relaxation period in the program.

Seated at the speaker's table with Chairman Gray were Charles Parsons, A. C. S. secretary, and his assistant, A. K. Emery; E. B. Babcock, representing the Office of the Rubber Director; Walter J. Murphy, editor of *Industrial and Engineering Chemistry;* B. J. O'Donnell, of the British Raw Materials Mission; E. R. Rowzee, of Canadian Synthetic Rubber Ltd.; V. du Vigneaud, chairman of the New York Section of the A. C. S.; and F. S. Conover, chairman of the New York Rubber Group; as guests of the Rubber Division. Also seated at this table were officers and directors of the Division, and H. E. Outcault, chairman of the local committee on arrangements for the meeting. Following dinner, after introducing those at the speaker's table to the audience, Chairman Gray made a few remarks on activities of the Division and then presented Mr. Parsons, who spoke briefly on his interest in the Rubber Division since its organization.

The Business Meeting

The business session held on Friday morning, April 28, heard the report of the chairman of the nominating committee, H. L. Trumbull, for officers of the Division for the coming year. The present vice chairman, W. A. Gibbons, of United

vision of Rubber Chemistry, American Chemical Society, April 27

(*Left to Right*): Charles Parsons, A. C. S. Secretary; Harold Gray (Goodrich), Rubber Division Chairman; H. E. Outcault (St. Joseph Lead), Chairman, Local Committee; E. R. Rowzee, Canadian Synthetic Rubber, Ltd.; J. H. Doering (Vanderbilt), Division Director; A. K. Emery, Assistant Secretary, A. C. S.; G. S. Haslam (N. J. Zinc), Division Director; V. du Vigneaud, Chairman, N. Y. Section, A. C. S.; A. H. Nellen (Lee Tire), Division Director; Bruce Silver (N. J. Zinc), Division Sergeant-at-Arms

States Rubber Co. was, of course, nominated for chairman; while the nominations for vice-chairmen for 1945 were: A. H. Nellen, of Lee Rubber & Tire Corp., and W. W. Vogt, of Goodyear Tire & Rubber Co. Other nominations were, for sergeant-at-arms: D. L. Flanders, of The B. F. Goodrich Co., and E. H. Nahm, of U. S. Rubber, and for directors, three to be chosen: F. Amon, of Godfrey L. Cabot, Inc.; B. S. Garvey, Goodrich; C. R. Haynes, of Binney & Smith Co.; W. G. Nelson, U. S. Rubber; H. J. Osterhof, Goodyear; and R. A. Schatzel, of General Cable Corp. S. G. Byam and C. C. Davis are *ex-officio* members of the board, and retiring Chairman Gray becomes an *ex-officio* member of the executive committee. Unanimous nominations for secretary and treasurer were H. I. Cramer and C. W. Christensen, respectively.

An abstract of the Crude Rubber Committee's Report from Chairman George A. Sackett, of Goodyear, was then read by Mr. Cramer. This report, which dealt with the evaluation and use of wild rubbers, proposed a new standard A. C. S. recipe #2 for use with these rubbers which was identical with the previous standard recipe except that the stearic acid is increased to four parts. The complete report will be found on pages 295-96 of this issue.

Mr. Haynes, chairman of the membership committee, reported on the work of his committee which had resulted in an increase of 12-15% in the membership of the Division since last fall. Total membership of the Division is now 1,108, and there are 1,458 subscribers to *Rubber Chemistry and Technology*.

It was announced that a committee had been appointed to study and revise the by-laws of the Rubber Division, with Mr. Gibbons as chairman and Mr. Cramer and Mr. Outcault as the other members of this committee.

Fall Meeting Again in New York

The fall meeting of the Rubber Division will be held in connection with the meeting of the parent society, scheduled for New York during the week of September 10. While most of the divisions of the American Chemical Society will hold their meetings at the Hotel Pennsylvania, the Division of Rubber Chemistry will again use the same facilities at the Hotel Commodore that have been so satisfactory during the last two meetings of the Division. The dates for the Rubber Division sessions are September 13, 14, and 15.

Guaranteed hotel reservation cards for the Commodore have been mailed to members of the Rubber Division, and it is strongly recommended that members make their reservations at once if they plan to attend this fall meeting. Hotel accommodations are and will continue to be scarce.

Conference on Time Phenomena in High Polymers

A CONFERENCE on new methods of measurements to provide the practical man of the plastics industry with as exact formulae as those developed for the steel industry was held jointly by the Society of Rheology and the Polytechnic Institute of Brooklyn in an all-day session at the Institute, 99 Livingston St., on May 20.

Participating were outstanding leaders in the plastics field, as follows: Raymond N. Fuoss, of General Electric Co., Schenectady, N. Y., who talked on "High Frequency Behavior of Polymers"; R. F. Boyer, Dow Chemical Co., Midland, Mich., who discussed "Transition Phenomena in High Polymers"; Turner Alfrey, Monsanto Chemical Co., Springfield, Mass., who spoke on "Molecular Mechanism of Deformation and Flow"; and Robert Simha, assistant professor of chemistry at Howard University, Washington, D. C., who made the introductory remarks and served as chairman of the conference. Herman Mark, international authority on high polymers, who is president of the Society of Rheology and professor of organic chemistry at the Polytechnic Institute, led the discussion which followed the talks.

Dr. Fuoss reported that synthetic polymers have furnished the engineer with such a wide variety of new electrical insulating materials that he is now much closer to the ideal situation in which he can design an insulation to fit the job on hand, rather than designing the equipment to fit the limited range of properties of materials occurring in nature. He then pointed out that polymers, from the electrical point of view, may be divided into two main classes: polar and non-polar, and then went on to explain how the non-polar polymers, such as rubber, butadiene polymers, polyisobutylene, polythene, and polystyrene, although being excellent insulators, had several disadvantages and except for compounded rubber have poor mechanical properties. By the addition of chlorine atoms, ester groups, sulphur atoms, etc., to the polymer molecule, the thermal and mechanical properties of the polymers can be modified. These changes in structure bring about simultaneous changes in electrical properties as compared with non-polar polymers; consequently this group of polymers shows fairly high dielectric constants and in certain well-defined and predictable ranges of frequency and temperature, shows power absorption.

In discussing "Molecular Mechanism and Deformation and Flow", Dr. Alfrey commented that while present development in the work in this field is largely theoretical, progress should eventually make it possible to design new materials according to prescribed specifications for controlling the rate of curling and uncurling of long-chain molecules. In rubbery polymers this rate of extension and retraction is rapid. In plastics it is slow. It is the job of research chemists, he said, to get the materials with certain stress-strain curves, and it is the manufacturing chemist's job to produce these commercially.

The development of fundamental principles of plastic flow and the perfection of methods of measurements will make possible better and better products, according to Dr. Boyer. This speaker discussed the problem of making the range between the brittle point and the softening point of resinous materials as wide as possible. It was pointed out that it is very difficult both to lower the brittle point and raise the softening zone at the same time, but there are certain conditions, such as high purity and homogeneity of resins, which lower the brittle point and at the same time raise the softening range.

During the discussion which followed the meeting Dr. Mark said that chemists will soon quit copying natural materials, slavishly and without imagination, and will begin to create new types of materials, with properties never before exhibited and excelling for certain purposes the qualities of all natural materials. The trend is from pure chemical substances to more and more complex systems, he declared, and gave as an example the most important synthetic rubber being produced in this country, GR-S, which involves two fundamental components, as do most of the other elastomers and plastics.

Acceptable in Navy Specifications

REFERENCE fluids SR-6[1] and SR-10[1] developed as immersion test media having uniform swelling, tensile retention, and extraction effects on synthetic rubber are reported as acceptable for use where diisobutylene or diisobutylene-aromatic blend fluids are specified in recently revised specifications for certain rubber products issued by the Navy Department, Bureau of Ships. These *ad interim* specifications are concerned with gaskets, hose of various types, life preservers, packing, and self-sealing fuel tanks and are mostly of the 33 G, 33 H, and 33P series, except for 23 P 8 (Int) for self-inflating life belts and R 10 T5 (Int) for self-sealing fuel tanks.

Reference fluid SR-10 is indicated as adequate where 100% diisobutylene is specified, and SR-6 where a blend of 60% diisobutylene and 40% aromatics is required, according to information from Stanco Distributors, 26 Broadway, New York 4, N. Y.

[1] India Rubber World, Dec., 1943. p. 274.

L. A. Group Hears Vodra

ABOUT 180 members and guests attended the May 2 meeting of The Los Angeles Rubber Group, Inc., at the Mayfair Hotel, Los Angeles, Calif., which was sponsored by the Kirkhill Rubber Co. The technical meeting preceding the dinner attracted about 85 members. This special session, a new feature, was directed by V. H. Vodra, of R. T. Vanderbilt Co., Inc. Mr. Vodra's address concerning a comparative evaluation of the physical properties of several synthetic rubbers was illustrated by slides, films, and demonstrations.

Following dinner, a cake with 25 candles was presented to T. Kirk Hill in recognition of the twenty-fifth anniversary of the founding of the Kirkhill Rubber Co. Mr. Hill introduced several rubber group members of the Kirkhill firm. Guests were introduced by chairman A. L. Pickard, of Braun Corp. Current events were given by Mr. Vodra. Program Chairman R. E. Hutchinson, Firestone Tire & Rubber Co., outlined the program of the summer outing at the Uplifters Club, July 22 and 23. He announced that sale of tickets will be in charge of C. H. Churchill, B. E. Dougherty Co., and G. Steinbach, H. M. Royal, Inc.

Commander A. W. Scott, radio commentator, described several South Pacific islands in an address, "Little Known Places in the News." A western melodrama in pantomime, acted by employes of the Kirkhill company, was followed by professional vaudeville acts.

A $25 War Bond door prize, donated by H. Friedman, Commercial Rubber Co., was won by A. Legman, Legman Truck Co. Other prizes donated by T. Kirk Hill were awarded as follows: a $25 gift order to W. E. Boswell, Thiokol Corp.; and bottled beverages to Mr. Vodra; H. H. Hummer, Xylos Rubber Co.; and D. Allen, United States Rubber Co.

Duralon

A NEW basic resin, Duralon, is a furane derivative made from waste agricultural products such as oat hulls and corn cobs. It is described as having the lowest water absorption of any organic resin, as well as a high electrical resistivity, absolute stability in storage and handling, and ease of workability. It is said to be insoluble (after thermosetting) in any solvent or combination of solvents. Before thermosetting, Duralon resins are readily soluble in ketones, chlorinated solvents, and many inexpensive hydrocarbons. In the pure form this resin is a heavy viscous dark maroon liquid. It changes to an extremely hard, dense, black substance after the incorporation of catalysts and the application of mild heat. Various chemical and physical properties can be developed in the base resin by addition of the usual fillers and lubricants. Duralon can, in certain stages, be machined by drilling, milling, turning, sanding, and grinding.

Preliminary studies have indicated that Duralon possesses definite molding possibilities, but its immediate importance is as an impregnant, a laminating and bonding agent, and a protective coating material. It has been recommended as a wetting, plasticizing, or tackifying agent for synthetic rubber compounds and as a modifying agent for synthetic resins. As an electrical insulating material, Duralon is reported to show unusual resistance to arc flashover and to tracking. The United States Stoneware Co.

Sodium Carboxy-Methyl-Cellulose Thickener

A CELLULOSE derivative which differs from most materials of this type, such as nitrocellulose, cellulose acetate, and ethyl celiulose, in being soluble in water is now in small-scale production. Called sodium carboxy-methyl-cellulose, this new compound is suggested for applications where hydrophilic colloids possessing marked suspending, thickening, stabilizing, and film-forming properties are required. Some of its possible applications are to thicken textile printing pastes, to emulsify emulsion paints and lacquers, and to provide a protective colloid for oil-in-water emulsions. Its film-forming properties make it useful in coatings, particularly for greaseproof coatings, and other uses are in the manufacture of boiler compounds, for creaming latex, in ceramics and can-sealing compounds, and for leather finishes.

Sodium-carboxy-methyl-cellulose is supplied as a white, granular powder, odorless, tasteless, and readily soluble or dispersible in water. Very viscous, stable aqueous solutions can be obtained with it. These solutions can be evaporated leaving colorless, tough, transparent films unaffected by the common organic solvents, oils, fats, and greases. Some salts and acids react with it to produce films insoluble in water. Tables and data have been prepared showing viscosity, effects of salts and acids, compatibility with various materials, and physical, chemical, and other properties. Hercules Powder Co., Wilmington, Del.

Akron Group Elects Officers

THE spring meeting of the Akron Rubber Group, attended by 242 persons, was held at the Mayflower Hotel, Akron, O., May 5. Dinner followed a cocktail hour.

Charles C. Miller, city editor of the *Akron Beacon-Journal*, spoke on "Wartime Production of Rubber in the Amazon Valley." A color film of his recent trip through Latin America was also shown. The program was concluded by several comedy and dance numbers.

Officers elected for the coming year include: Walter J. Krantz, Goodyear Tire & Rubber Co., chairman; Earl B. Busenburg, Philadelphia Rubber Works, vice chairman; and J. R. Moore, Standard Chemical Co., secretary-treasurer.

The cocktail hour and entertainment was provided by the courtesy of the following:

Adamson Machine Co., Akron Chemical Co., Akron Standard Mold Co., L. Albert & Son, American Zinc Sales Co., Anderson-Prichard Oil Corp., Barrett Division of Allied Chemical & Dye Corp., Binney & Smith Co., Stewart Bolling & Co., Bridgwater Machine Co., Godfrey L. Cabot, Inc., Caldwell Co., Continental Carbon Co., Damascus, Inc., Dow Chemical Co., Dugan & Campbell, E. I. du Pont de Nemours & Co., Inc., Russell Farley & Co., Farrel-Birmingham Co., Inc., R. H. Freitag Mfg. Co., C. P. Hall Co., Harmon Color Works, Inc., Herron Bros. & Meyer, Hycar Chemical Co., Interstate Welding Service, J. A. Kendall, Loewenthal Co., C. F. Marshall & Co., McNeil Machine & Engineering Co., Miami Boiler & Machine Co., Midwest Rubber Reclaiming Co., Monsanto Chemical Co., H. Muehlstein & Co., F. F. Myers Co., National Rubber Machinery Co., National-Standard Co., Naugatuck Chemical Division of United States Rubber Co., New Jersey Zinc Co., Philadelphia Rubber Works Co., Piqua Stone Products Co., Pittsburgh Plate Glass Co., Rex-Hide, Inc., B. W. Rogers Co., A. Schrader's Son, A. Schulman, Inc., V. L. Smithers Laboratories, Standard Chemical Co., Standard Oil Co. of Ohio, Stauffer Chemical Co., Sun Oil Co., Synthetic Products Co., Tanney-Costello Co., Thiokol Corp., Thompson, Weinman & Co., Titanium Pigment Corp., R. T. Vanderbilt Co., C. K. Williams & Co., Wilmington Chemical Corp., Chas. T. Wilson Co., Witco Chemical Co., Xylos Rubber Co.

High-Frequency Heating Licenses

LICENSES under the well-known patents of H. A. Leduc and R. A. Dufour, covering the application of high-frequency heating in the production, processing, and manufacture of rubber, plastics, wood, and other products, are now available in this country. The B. F. Goodrich Co., Akron, O., will issue licenses covering rubber applications. H. H. Giodvad Grell, 33 University Place, New York 3, N. Y., will issue licenses in all other fields.

Among these patents are U. S. Nos. 2,129,203, 2,163,993, 2,188,625, 2,261,847, 2,280,771, and 2,303,341. The latter patent, issued December 1, 1942, is claimed to be a basic patent for coagulating any "coagulatable fluid material"—from spaghetti to wallboard. The patents are the results of research and experiments which, going back to 1920, were financed over the years by the French Government.

The main technical advantage of the Leduc and Dufour processes and apparatus is that non-metallic, dielectric materials can be *rapidly* and *uniformly* heated *throughout* their mass, and that temperature and temperature rise can be accurately controlled. This high-frequency heating process, originally developed by the inventors with a view to overcoming the difficulties inherent in the vulcanization of massive rubber objects, has now become the means for making possible heat transfer in many poorly conducting or non-conducting materials.

According to the claims, the practical applications of the process in the rubber field include: thermal plasticizing of bales of raw rubber; reclaiming by heat; vulcanization of sponge, thick masses, roll coverings, rubber coated metals, rubberized or plasticized parts, proofed goods, and molded articles; concentration, sterilization, and vulcanization of stabilized latex; coagulation of heat-sensitized or electrically unstable latex for making thread, tubes, hoses, tires, footwear, etc.; manufacture of insulated cables and wires; and production of latex sponge.

The advantages of high-speed, uniform heating by means of high frequency find similarly wide applications in the fields of plastics, wood, and other poor conducting or non-conducting materials.

Leduc's invention was demonstrated at the Exposition in Paris in the Summer of 1935. The French Rubber Association has honored him with its medal. In a report to the French Senate, Professor Breton stated that the Leduc-Dufour inventions alone justified the more than 20 years' operation of the immense Government Research Center.

Cure of GR-S Discussed

THE Northern California Rubber Group meeting on April 27 at the Claremont Hotel, Berkeley, Calif., was attended by about 40 members and guests. A paper on the cure of GR-S in thick sections was presented by Ross Morris and Joseph Hollister, of the Mare Island Rubber Laboratory. The paper, illustrated with slides, established that heat transfer with GR-S is greater than that of *Hevea* rubber, a fact of interest to all those at the meeting engaged in the manufacture of tires and thick molded goods.

A "Rubber Red Book", donated by M. E. Lerner, editor of *The Rubber Age*, New York, N. Y., was won by C. F. Kelleher, Laher Spring & Tire Corp., Oakland, Calif. A drawing was also held for eight bottles of beverage, the gift of the California Cotton Mills, Oakland, Calif.

UNITED STATES

Alcohol Requirements to Remain High; Natural Rubber Stockpile Replenishment Too Slow

It was emphasized by Rubber Director Bradley Dewey on May 19 in his testimony before the Senate Judiciary Subcommittee investigating the liquor situation that the present requirements for industrial alcohol for synthetic rubber must remain at their level of 365,000,000 gallons annually for 1944 and 1945, unless there is a change in the demand for 100-octane aviation gasoline. If it is found that an even greater amount of aviation gasoline is necessary, even more than the 365,000,000 gallons of alcohol that have been listed as the minimum requirement for synthetic rubber might be needed, Colonel Dewey said. He also insisted that the synthetic rubber program must not be interfered with, particularly in view of the rapidly shrinking natural rubber stockpile and declared that any arbitrary reduction of the present allocations of industrial alcohol for the program would seriously jeopardize it.

It was further stated that although more butadiene-from-petroleum plants were beginning to get into production and although some of them were operating above their rated capacity, this situation would not reduce alcohol requirement unless increasing amounts of butylenes became available for rubber production. Alcohol from petroleum was not considered to be available in quantity until after the middle of 1945. Colonel Dewey said that he would like to have 50,000 tons more of GR-S as a working inventory right now so that rubber processors could withdraw from stockpiles rather than demand that supplies be sent directly from the government plants to them, but that any efforts to build up the working inventory of GR-S would require the use of more alcohol which apparently would not be possible under existing conditions of supply and demand for the raw material.

The WPB on May 15 reversed the decision of its Requirements Committee, which in April decided against the construction of a plant near Eugene, Ore., for the production of industrial alcohol from wood wastes by a modified Scholler process. According to Donald Nelson, this project of the Williamette Valley Wood Chemical Co. has now been approved on the basis of its exploratory value. Successful development of a method for large-scale industrial alcohol production from wood wastes, he said, would represent a form of national insurance against any future raw materials shortages. The WPB chairman said that the Oregon plant presumably could not be brought into operation before the spring of next year and therefore could not make any immediate contribution to the war effort and that it was for this reason it was originally turned down by the Requirements Committee. The new plant's capacity, 4,100,000 gallons a year, will not of itself have any great significance in the 1945 alcohol program, but suitable wood waste supplies appear to be such that more than 100,000,000 gallons of annual alcohol capacity could be predicated upon this type of operation if it became necessary to give up the use of grain because of its need as food, Mr. Nelson stated. Pilot-plant experiments to adapt the German process to American conditions have been carried out since January, 1943, at Marquette, Wis., under the supervision of the Office of Production Research and Development, it was revealed.

Natural Rubber Supply Developments

Increasing concern has again become apparent regarding the rapidly dwindling stockpile of natural rubber since no immediate relief from the necessity of using considerable amounts of natural rubber mixed with synthetic rubber in the production of heavy-duty tires, surgical goods, and other items appears possible. Supply and demand for natural rubber cannot be brought into balance at present, and additions to the natural rubber stockpile from sources outside the United States are still far from the point where they could be adequate in building up a reserve, even if consumption could be reduced to the barest possible minimum.

It was announced on May 17 that the Rubber Development Corp. and SHADA in Haiti were engaged in negotiations looking toward a cancellation of the existing agreement between SHADA and Rubber Development on *Cryptostegia* and the substitution of a new agreement. The existing agreement provides for the direct planting, cultivation, and harvesting of *Cryptostegia* by SHADA on leased land, these operations being financed by Rubber Development under agreed budgets. All planting work has now been completed by SHADA. The proposed new agreement contemplates turning the leased land back to the peasant owners as rapidly as possible with the exception of the Gonaives Experiment Station and several other experimental areas, which SHADA will continue to operate in behalf of the Rubber Development Corp. The proposed agreement further contemplates that Rubber Development will undertake to purchase from SHADA until December 31, 1946, all rubber produced in Haiti at the same prices as may be currently paid by Rubber Development in other producing countries of the Western Hemisphere for comparable grades and qualities of rubber.

This development is in accordance with the policy adopted by Rubber Development in February of this year when it turned over the major portion of the actual procurement of rubber in Brazil to the agencies of that country.

In this connection it was reported from Honduras by Russ Symontowne, of the *New York Daily News*, that Dr. V. C. Dunlap of the United Fruit Co. has developed a chemical process for the recovery of *Cryptostegia* rubber which might be useful in improving the output of this rubber from Haiti, since the tapping method originally attempted for this rubber has not apparently been commercially practical.

The United Fruit Co. undertook the *Cryptostegia* research at the request of the United States Government, it was said.

The Senate Agricultural Appropriations Subcommittee on May 16 voted to recommend reinserting $5,420,000 into the agricultural appropriations bill for the continuation of the U. S. Emergency Project for guayule rubber, and it is expected that a similar recommendation will be obtained from the House Committee after the Senate and House conferees again discuss this item. This Senate action may be attributed to a considerable extent to the testimony in favor of the continuation of the guayule project given last month by Rubber Director Dewey, Gordon Salmond of the Forest Service, and Congressman Poage of Texas. The Rubber Director in commenting on the Senate action said:

"This office has testified frequently before Congressional committees and has said publicly on other occasions that this is not the time to contemplate the destruction of possible sources of rubber. We are naturally gratified to learn that the Senate has seen fit to vote funds for the continuation of the guayule program."

Combine Raw Materials Board Report

On May 21 the Combined Raw Materials Board released its second annual report concerning its work during its second year of operation which ended January 26, 1944. This report called attention to the fact that natural rubber still remained in critical supply and demanded continual attention and drastic action. It mentioned how all African rubber (except Liberia) was assigned to the United Kingdom and other Empire countries, while all Western Hemisphere and Liberian rubber was reserved for the United States. In addition, the report said, rubber produced in Ceylon has been allocated in varying amounts to one or another of the major consuming countries to adjust the position as required. Furnishing supplies of major metals as well as rubber from the United States, the United Kingdom, and Canada to the U. S. S. R. has been carried out under proctol agreements, the third of which came into operation in July, 1943. A Combined Rubber Committee has been in operation with the Office of the United States Rubber Director, and in association with the Combined Production and Resources Board, a Combined Conservation Committee was set up during the year. Rubber is one of the materials listed in Appendix I of the report as being under review by the CRMB at the end of 1943, and in this connection it is of interest to quote the report where it states:

"In general it may still be said that the supply position of most commodities under allocation or review by the Board must remain under some measure of control until the end of the war."

The announcement of the British Colonial Office on April 30 that the International Rubber Regulation Committee was dissolved as of that date might be significant in this connection. This committee and the International Rubber Regulation Agreement, it will be recalled, were extended from December 31, 1943, until April 30, 1944, without any regulatory functions for the purpose of continuing international cooperation in matters affecting rubber between the United Kingdom, the Netherlands, and India and also for the purpose of trying to work out some means of interesting the United States in joining into some international agreement on rubber production and consumption after the war. The CRMB has replaced and extended the operations of the IRRC during the war period, and the matter of whether or not there will be any control of the world's production and consumption of rubber after the war will most likely be decided by the trend of future events, which are not predictable.

On May 22 our State Department through Under-Secretary of State Edward R. Stettinius, Jr., indicated indirectly, but positively that the United States would not aid Argentina in its recently announced

efforts to build up a synthetic rubber industry with the aid of "know how" from the United States. The Under-Secretary's comments were that American rubber production was part of the essential war program and that it would be impossible for us to agree to export equipment, patents, or "know how" to the Argentine Government at this time.

U.R.W.A. to Make Industry-Wide Wage Demand

It was announced from Akron early in May that the United Rubber Workers of America, C.I.O., will make an industry-wide wage demand for blanket increases for day work and a night-shift bonus, by G. L. Patterson, general counsel for the union. The instructions to local unions about to open negotiations for a new contract are that they include the 1944 wage program in their demands and that those unions whose contracts contain provisions for opening contracts at any time for wage discussions take advantage of this clause in their contracts. After the demands are made on management, Mr. Patterson will choose a representative number of them affecting the more than 200,000 rubber workers and ask that they be heard by the NLB, it was said. The complete 1944 wage program of the U.R.W.A. asks for a general wage increase of 12¢ an hour, a night-shift bonus of 10¢ an hour for work performed between 6:00 p.m. and 6:00 a.m. an adjustment in rates for millroom workers and skilled maintenance employes in addition to the general wage increase, and an industry-wide vacation schedule for all rubber workers. This is the first time in the history of the rubber union that an industry-wide wage demand is being made.

WPB Conferences to Increase Tire Output

A meeting was held in Akron on May 22 between officials of the U.R.W.A. and Joseph Keenan, of WPB's labor section, to find out how to remove any hindrance or bottlenecks to tire production, whether management or labor is responsible. This development in the tire situation came at about the same time that David Lawrence, Washington columnist, placed the blame on workers and the union for allegedly maintaining limits of production. L. S. Buckmaster, international vice president of the U.R.W.A., took exception to Mr. Lawrence's statements and reported that tire production has been greatly increased since the war and that this was in addition to the fact that the workers are now on an eight- instead of a six-hour day. Mr. Keenon stated that he came to Akron to show labor what the needs of increased tire production were and that he knew he could depend on labor's full cooperation. A conference with management representatives was scheduled for May 24.

It will be recalled that last fall former Rubber Director Wm. Jeffers called a conference of management and labor officials in Washington when it became evident that a considerable increase in rubber manufacturing facilities would be necessary in order to meet the essential military and civilian tire requirements. Consideration was given at the time for building new tire plants outside of the Akron area, but this was opposed by the U.R.W.A., who declared that considerably more than the desired number of tires could be produced in existing plants if additional machinery was installed. Since much of the data indicates that the required high level of tire production has not been attained, a review of the situation has become necessary to try and determine and remove the causes.

The War Advertising Council and the Office of War Information prepared and distributed early in May to newspapers, tire dealers, and rubber companies and their local advertising agencies three tire conservation advertisements for local use. This advertising was part of a comprehensive rubber conservation program planned to persuade car drivers and truck operators to let their local tire experts keep their tires in shape and recap them when necessary. The broadside of the local advertising program carried a message from Rubber Director Dewey, asking support of the tire dealers and calling attention to the need of tire conservation this year to avoid a breakdown of civilian transportation.

New GR-S Specifications Effective July 1, 1944

It was learned late in May that new specifications for GR-S to become effective on July 1, 1944, will be announced within the next two or three weeks. New limits for the properties of GR-S, a change in the chemical analysis involving the acetone extract, fatty acid, and soap determinations, and a change in the method of selecting results for the tensile strength determination were among the changes reported for inclusion in the new specifications.

Rubber Reserve Co. Circulars 26 and 27

Under the date of April 22, 1944, the Rubber Reserve Co. issued Circular No. 26 in which it was stated that it has developed that the monthly certificates required to be submitted to Rubber Reserve by manufacturers, giving the amount of natural and synthetic rubber used in producing under "War Orders" have not contained sufficient information in the form of prime contract numbers for some of the government procurement agencies. Circulars Nos. 21, 22, and 25 had provided details of the use of these monthly certificates. According to Circular No. 26, for rubber consumption reported on the certificates submitted for the month of June 1943, and for each month thereafter, each manufacturer is required to submit to Rubber Reserve a separate list for attachment to each such certificate reflecting the prime contract numbers of *Lend Lease contracts only* for which the rubber was reported so used and reflecting the number for each prime contract number listed.

Circular No. 27, issued May 3, stated that effective with the sale of GR-S and GR-S latices for delivery during June, 1944, and subsequent months, requests for the purchase of these materials should be addressed to the sales department, Rubber Reserve Co., 811 Vermont Ave., N. W., Washington 25, D. C., instead of to the Office of the Rubber Director, War Production Board, as has heretofore been the custom. Requests for such purchases should be submitted in accordance with a sample letter attached to this circular and should be submitted in duplicate in time to reach Rubber Reserve not later than the twelfth day of the month preceding the month of delivery.

Export License Changes

Foreign Economic Administration, Washington, D. C., has received from the WPB authority to assign, within allocation limits, ratings when required for the procurement of rubber products for export to: 20 American republics, Afghanistan, Belgian Congo, British Oceania, Eire, French Guiana, French Oceania, French West Indies, Greenland, Liberia, Madagascar, Miquelon and St. Pierre, Newfoundland and Labrador, Netherlands possessions in Caribbean, Portugal and possessions, Spain and possessions, Sweden, Switzerland. Exporters need not file form WPB-541 with applications for these products, but shall indicate on the application for individual license or release certificate that such rating is requested. In the case of applications for the above destinations requiring export licenses to be rated in accordance with this procedure, exporters no longer need submit the fourth signed copy of the FEA 119, formerly required under the WPB-541 (PD-1A) rating procedure. For countries listed above for which a program license is in effect, the fourth copy of FEA 119 must continue to be submitted where it is used for a release certificate. The rating assigned by FEA under this procedure will be stamped on the original which will be returned to the exporter. The procedure and provisions of "Current Export Bulletin No. 146," Part III, will apply to these licenses and also to release certificates.

FEA "Current Export Bulletin No. 162" (May 11) indicates that exporters of rubber manufactures, Schedule B Nos. 2014.00 through 2099.90, are no longer required to specify on their license applications the crude, synthetic, or reclaimed rubber content of the items to be exported. But exporters must indicate the total net weight (except in the case of applications for certain tires and tubes as explained below) of each Schedule B class of rubber product included on the application. This will coincide with our allocations now charged on a net weight basis. Exporters of tires and tubes, Schedule B Nos. 2060.00 through 2067.00, will continue to apply in units as heretofore except that applicants no longer need show the crude, synthetic, or reclaimed rubber content. Nor will it be necessary to indicate net weight, except for bicycle, airplane, and industrial tires and tubes. (Revises Comprehensive Export Schedule No. 13, page 116, item 28.)

"Current Export Bulletin No. 164" (May 20) covers commodities that may be exported to the other American republics under the "BLT" (blanket) export license procedure. Included are electrical machinery and apparatus, automotive parts and accessories, rubber and manufactures, and valves.

Golden West Rubber Mill is the firm name under which Ida and Sol Goldenberg have published a certificate that they are conducting business at 8228 S. Central Ave., Los Angeles, Calif.

The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y., recently formed a molded and extruded rubber goods committee with W. Miller Cook, vice president of the Ohio Rubber Co., Willoughby, O., as chairman. The committee, which represents 119 manufacturers who produce more than 90% of all the rubber products, other than tires and tubes, will act as an advisory group to the WPB and among other things will recommend which items the industry should be permitted to manufacture under wartime restrictions in order to meet civilian requirements.

Pricing and Rationing Schedules Changed

Maximum prices for sales to the Defense Supplies Corp. of bare rubber thread, yarn covered rubber thread, and elastic web and braid were set April 27. Since 1942, DSC has had in effect a program for purchasing frozen stocks of these commodities, and the new ceilings are the same as those in this purchase program. But since its inception the maximum prices for some of these commodities have been changed. These ceilings are now under MPR 149—Mechanical Rubber Goods—and MPR 204—Special Sales of Industrial Materials. Therefore the prices set in this order differ (some are higher, others the same) from the ceilings previously in effect.

The price ceiling for bare rubber thread sold to DSC has been fixed at the manufacturer's October 1, 1941, list price, except where a federal excise tax was paid. This tax was in effect from October 1, 1941, to November 1, 1942. Holders of bare rubber thread who paid the tax when buying the thread during this period may now add it to the manufacturer's October 1, 1941, list price in fixing their ceiling.

Manufacturers or coverers may sell yarn covered rubber thread to DSC at the following maximum price: either (1) the manufacturer's or coverer's October 1, 1941, list price for the product; or if he had no list price as of that date, (2) the United States Rubber Co.'s October, 1941, list price, chosen as the alternate one because the company is the largest single producer of covered rubber thread.

Maximum prices for sales of yarn covered rubber thread by wholesalers, jobbers, and manufacturers other than manufacturers of this product are fixed at the lower of: (1) the manufacturer's or coverer's March, 1942, list price; or (2) in case a seller bought from a manufacturer or coverer who had no March, 1942, list price he may use his net invoice cost as his ceiling price.

In its original program DSC bought rubber thread and yarn from all sellers other than manufacturers and coverers on the basis of March, 1942, prices, established under General Maximum Price Regulation. However last summer Amendment 9 to MPR 149 set the ceiling for this commodity for wholesalers and jobbers at October, 1941, levels. It would be unfair to require sellers who had not sold their covered rubber thread to DSC at the March, 1942, level to sell at lower prices (October, 1941) than sellers who have already sold their thread. Therefore OPA set the top price at the March, 1942, level. This provision is based on the fact that these idle and frozen commodities may be sold for some other use than that for which their form was originally altered and as a result would lose a major part of their value. Thus, RMPR 204 required the seller to absorb a 20% loss while the government agency or other purchaser buying the commodity must pay for the labor and other cost involved in transforming the partially fabricated items for another purpose. However, since elastic web and braid held by holders who have altered its form will not decline in value when bought by DSC, OPA believes that the maximum price should not be reduced to 80% of cost.

The ceiling price for sales to DSC of elastic web and braid by holders who have altered its form is now to be determined under MPR 220 or GMPR, whichever is lower. The ceiling price on sales of elastic web and braid by holders who have altered its form is determined by RMPR 204 (Order 14), which provides for a maximum price of only 80% of cost for commodities not sold in the original form in which the seller bought them.

Four changes in MPR 478—Coated and Combined Fabrics—appear in Amendment 3, effective May 24, and were recommended by the industry advisory committee for these products. They provide simplified methods of determining ceiling prices in line with general industry practice. The general price level is not changed, and retail prices are not affected. The changes follow:

1. To determine ceiling prices for coating and combining services on cloths owned by others, manufacturers will select a fabric they sold during the base period on which they performed the same services. The base period for civilian goods is March, 1942; while for military goods it is either April, 1942, or under special circumstances, May 1, 1942, to April 30, 1943. From the maximum price of the fabric sold during the base period, manufacturers then deduct the sum of (1) the base period cost of the cloth, and (2) the working allowance on the contract. The resulting ceiling must be reported to OPA within ten days. Sales may be made at the new price meanwhile. If OPA does not advise otherwise within 15 days, the reported ceiling may be taken as approved. Previously on these operations manufacturers had to apply to OPA for a specific ceiling.

2. For fabrics different from those dealt in during the base period manufacturers may apply the regulation's formula, no matter how much factory costs exceed those of base period fabrics. Heretofore the formula could only be used when factory costs for the new product did not exceed those for base period fabrics by more than 25%. For the others application had to be made for a specific ceiling.

3. Where a manufacturer is required to redetermine his ceiling after two months' production, he may do so simply by substituting his actual labor hours and quantity of materials for the estimates used in his original computation of the maximum price. He need not go through the process of selecting another comparable item.

4. Where odd lots of cloths are substituted in manufacturing finished coated or combined fabrics, manufacturers will determine ceilings by adjusting the ceiling for a standard grade of the fabric by the difference in the base period cost of the cloth. The resulting ceiling must be reported to OPA for approval, which shall be taken as granted if manufacturers are not advised otherwise within 15 days. Previously a more detailed formula procedure was called for.

Retail maximum prices ranging from 15 to 30¢ a pair for higher quality rubber heels sold in the home replacement trade were established by Amendment 4 to MPR 477—Sales of Rubber Heels and Soles in the Shoe Factory and Home Replacement Trades—effective May 24. For the same higher quality rubber heels, manufacturers were given ceilings ranging from 90¢ to $1.65 per dozen pairs, and wholesalers at from $1.20 to $2.20 per dozen pairs. Since January 7, 1944, retailers had ceilings ranging from 10 to 15¢ a pair. At that time the indications were that only lower quality special competitive grade heels such as normally sold in this trade would be on the market. But the industry is now making available, for this trade, rubber heels of higher quality than formerly, which cannot profitably be sold at the ceilings established for the lower quality heels. When this trend became definite earlier last month, manufacturers and wholesalers were given adjustable pricing authority effective April 3, 1944, to sell at prices to be later established by OPA. Ceilings on May 24 were established at all three levels of distribution for two higher quality grades, designated as standard and competitive. The former ceilings, which continue in effect on the lower quality heels, apply to special competitive grade.

To simplify inventory records, retailers and distributers of men's rubber boots and rubber work shoes will be given statements covering ration certificates exchanged or issued to them by OPA district offices, according to Amendment 10 to RO 6A—Men's Rubber Boots and Rubber Work Shoes—effective May 23. Formerly, whenever a dealer exchanged rubber footwear certificates for a certificate good for another type or was given extra certificates to increase his stock, he had to correct his OPA inventory form to show these changes. Since district offices hereafter will furnish a full statement of each change, dealers will no longer have to correct their records, but are to attach the statements to their invenory forms instead.

OPA also said that half-pairs of rationed rubber footwear may be used as samples provided the dealer furnishing the footwear keeps title to it. This will permit dealers to distribute half-pair samples to salesmen and other dealers without receiving ration certificates.

Prices figured and filed by manufacturers of corsets and allied products containing rubber or rubber substitutes, under the second or third pricing methods of MPR 220—Certain Rubber Commodities—are not their maximum prices unless the prices are correctly computed, OPA stated May 21. If the prices are incorrectly computed, they are not the manufacturers' ceilings even though OPA does not disapprove them within 15 days from the date of mailing the price report. The second pricing method is used for pricing garments having changes necessitated by shortages of materials or parts; the third pricing method is used for pricing garments having other than minor changes or changes other than those necessitated by shortages of materials or parts. Under either method, manufacturers compute their maximum prices and file them with OPA.

Provisions of the regulation governing prices for special sales of idle or frozen materials have been extended to include idle machinery, tools, and other assembled industrial products, by Amendment 2 to RMPR 204—Special Sales of Industrial Materials. Effective May 23, this action transfers coverage of these idle machinery articles from the regulation establishing prices for machines and parts, and machinery services, which requires a person who does not ordinarily sell machines and parts to apply to OPA for determination of a maximum price. No change in prices will result from transferring the articles to coverage by another regulation.

Tire Regulations Affected

Retailers may sell passenger-car tire reliners made from scrap tires, regardless of size or ply, at a maximum price of $2.25 each, or the highest prices they charged in March, 1942, whichever is higher, according to Amendment No. 129 to RSR 14 to GMPR, effective May 8. Heretofore retail ceilings were the highest prices charged by each individual seller in March, 1942. The alternate ceiling now provided enables certain retailers who were "frozen" at ceil-

ings beneath this figure to sell up to $2.25. This alternate provision will affect only a few retailers, as in most cases current prices for these reliners are above $2.25, OPA said. The action, however, will enable these few retailers to sell reliners without incurring an out-of-pocket loss, because of existing higher costs to them. At the same time it should make available to consumers some added sources of supply cheaper than the general supply available. OPA stated the action is temporary since it plans to establish specific dollar-and-cent ceilings for these reliners, which will apply to all sellers. Maximum prices for manufacturers and wholesalers are generally based on March, 1942, sales. Prior to and during March, 1942, manufacturers' prices for reliners were generally increasing. In the case of some retailers, particularly mail order and other large sellers, there was a lag between the increase in manufacturers' prices and increases at the retail level, which caused some retailers to be "frozen" at ceilings below the cost of further purchases.

Used tires and tubes no longer may be sold at the ceilings established for them when they are mixed in with shipments of scrap rubber, but must be sold at ceilings set for scrap rubber, unless they are segregated from the scrap rubber, according to Amendment 11 to RPS 87—Scrap Rubber—effective May 11. Heretofore, where used tires and tubes were mixed with scrap rubber, the scrap rubber regulation said that the scrap rubber could be sold at the scrap rubber ceilings and the used tires and tubes could take the maximum prices established on those products. Amendment 11 now brings the scrap rubber regulation in line with a similar provision incorporated in the new regulation on tires and tubes which becomes effective May 1.

Amendment 1 to RMPR 131—Camelback and Tire and Tube Repair Materials—effective April 29, permits manufacturers to charge 8¢ a pound more for pre-designed camelback than for the regular type, to compensate for the higher labor costs involved in its manufacture. While this differential was provided for in the original RMPR 131, it applied only to sales by the Webster Rubber Co., then the only seller of such camelback. OPA has now been informed, however, that at least one other producer wishes to sell this camelback and other producers may enter the market. Accordingly the existing differential may be applied by any seller of pre-designed camelback. Therefore 8¢ a pound may be added to the following ceilings by such manufacturers: Grade A, 28¢ a pound; Grade C, 23¢ a pound; Grade F, 18¢ a pound.

This camelback is a type of rubber recapping stock (other than base or lug stock) pre-designed for use with the open steam method of retreading or recapping by cutting a non-skid pattern into it. This differs from the regular type, which has the non-skid tread molded into it as it is vulcanized in a recapping mold.

Order 5 (Adjustable Pricing on Manufacturers' Sales to Brand Owners) under MPR 143—Wholesale Prices for New Rubber Tires and Tubes—on May 2 was revoked, subject to the provisions of Supplementary Order No. 40.

Order No. 14 to RMPR 143—Wholesale Prices for New Rubber Tires and Tubes—effective May 1, provides imported new natural rubber tires and tubes for passenger cars and trucks, a limited supply of which is to be made available for civilian purchase, with dollar-and-cents retail ceiling prices, and specific discounts from these ceilings are prescribed for the determination of wholesale maximum prices. Ceiling prices are established on all imported natural rubber tires and tubes at the same levels applicable to domestic natural rubber tires and tubes of the same sizes and quality. For those tires and tubes not the same as domestic sizes, ceilings are established in normal relation to the other sizes. The new ceilings have been established at this time primarily to cover a relatively small quantity of tires and tubes imported from Latin America. They are not needed at present for military use and are to be distributed for civilian use through regular trade channels by the Defense Supplies Corp.

Orders 1, 2, and 3 (effective May 1) to MPR 528—Tires and Tubes, Recapping and Repairing—authorizes maximum prices for certain tires of United States Rubber Co., Goodyear Tire & Rubber Co., and Pennsylvania Rubber Co., respectively.

Amendment 76 to RO 1A—Tires, Tubes, Recapping and Camelback—effective May 1, widens the eligibility for new tires to include all motorists using their cars for occupational driving—"B" and "C" bookholders—following a substantial increase in civilian allocations of new passenger-car tires by ORD. At the same time two other steps were taken to broaden the eligibility for passenger-car tires. Motorists holding the "A" ration book, previously ineligible for tires, now may secure tires from the small remaining stock of used tires, now "out of quota." Those light delivery trucks previously able to buy only used tires may now get new passenger tires as well.

Larger rationing quotas for May of passenger tires and tubes, small truck tires and tubes, and farm tractor and implement tires were announced May 1. The May allocation of new passenger tires given to OPA by ORD was broken down into a quota of 875,525 and a reserve of 424,475. The reserve is not allocated directly to local boards, but is kept at the OPA national, regional, and district offices for distribution during the month to the boards on the basis of demand. In April, 1,050,000 new passenger tires were available for rationing by OPA's local boards. The new passenger tube allocation was also raised from 850,200 in April (an announced April quota of 691,325 plus a reserve of 158,875) to 1,100,000 in May. The allocation of small-sized truck tires also was increased about 70,000 but the continued shortage of large-sized truck tires was reflected in the May allocation of 135,307, almost the same as the small number distributed in April. In the farm tractor and implement tire category greater production has made possible a larger allocation for May so that the needs of farmers can more nearly be met. The allocation of rear-wheel tractor tires was raised from 22,481 (a quota of 13,800 and reserves of 8,681) in April to 30,000 in May. A larger increase, however, could be made in the front tractor and implement tire category.

Following is a tabulation of the May quotas and reserves broken down by types of tire:

			Total Allocation for	
Passenger and Motorcycle:	Quota	Reserves	May	April
Grade 1 (New Tires)	875,525	424,475	1,300,000	1,050,000
New Tubes	852,388	247,612	1,100,000	850,200
Truck and Bus:				
Tires—7.50 or smaller	253,487	71,431	324,918	255,000
Tires—8.25 or larger	115,150	20,157	135,307	138,025
Tubes	253,532	121,468	375,000	263,032
Farm Tractor and Implement:				
Rear tractor tires	18,400	11,600	30,000	22,481
Front tractor and implement tires	36,800	15,200	52,000	34,799
Tubes	41,400	26,600	68,000	32,495

MPR 414—Tire Mileage—had defined 100-level tires by reference to the brands in RPR 63—Retail Prices for New Rubber Tires and Tubes—now superseded by MPR 528—Tires and Tubes, Recapping and Repairing. Consequently Amendment 1 to 414, effective May 15, deletes this reference to RPS 63 and substitutes a definition of 100-level tire consistent with that in RMPR 143—Wholesale Prices for New Rubber Tires and Tubes.

OPA on May 7 reported that a mileage saving of almost 330 million miles, in comparison with 1941 travel, was made last year in consequence of state government cuts in official automobile travel. This huge mileage reduction is equivalent to savings of about 22 million gallons of gasoline, 44 thousand tires, almost 55 hundred cars, and 15 million dollars.

Amendment 8 to RO 1E—Mileage Rationing: Tire Regulations for the Territory of Hawaii—effective May 3, among other changes revises requirements for securing inner tubes, for eligibility of recappers for curing tubes, and for transfer and mounting of used tubes and tires.

Significant overall changes in the rubber industry plus the inability of the Virgin Islands' motorist to obtain recapping services for his tires, and the absence of adequate supplies of other than new tires, necessitated revising (effective May 1) RO 1C—Tire Rationing Regulations for the Virgin Islands—to suit local needs. Rev. RO 1C will assure the maintenance of essential needs and at the same time remove certain unworkable features previously developed in the Islands as a result of the changing rubber scene.

Dow Receives Chemical Award

WILLIAM HENRY DOW, president of Dow Chemical Co., Midland, Mich., was tendered the Gold Medal Award of the American Institute of Chemists for 1944 at the annual meeting of the Institute, May 13, in the Biltmore Hotel, New York, N. Y. Rubber Director Bradley Dewey, speaking on "Dow and the War Effort," pointed out that Dr. Dow's early development of polystyrene resins had furnished experience for the production of enough styrene to supply synthetic rubber needs for the war effort. Dow process plants are now making two-thirds of all the styrene used in synthetic rubber. In his acceptance address Dr. Dow warned of current suggestions to place scientific research under organized control of a single group of scientists and of the serious effect such control would have upon future developments in physics and chemistry.

Dr. Dow's inventions and developments in magnesium and synthetic rubber are of immediate and tremendous importance in winning the war, but they are only two of many noteworthy achievements. Dr. Dow is regarded as one of the foremost leaders of research in the country. His vision has opened new avenues of chemical development and has encouraged and inspired young chemists to greater endeavors.

WPB Committee Reports

The outlook for a freer use of rubber and plastic for soles was a principal topic at meetings of the Shoe Manufacturers and Shoe Retailers Industry Advisory Committee in Washington, May 10 and 11, with WPB officials, who explained that in consequence of the government's release of certain amounts of scrap rubber, a freer supply of vinyl plastic scrap, and the increased production facilities of rubber sole manufacturers, it was expected that rubber and plastic soles would be in freer supply during the second half of this year. At present, all shoes with rubber soles are rationed, and there are certain restrictions of styling of shoes with rubber and vinyl plastic soles. Consideration was given to the possibility of removing styling restrictions on rubber and vinyl plastic soled shoes. Also discussed was the possibility of recommending to OPA that rubber and plastic be removed as a basis for rationing. WPB pointed out, however, that even if such action should be considered favorably, all shoes containing leather, regardless of the type of sole, would still be rationed-type footwear. The production of children's and misses' shoes likewise was considered.

The Toy Industry Advisory Committee recently was told no rubber can be made available for toys until military demands for rubber decrease radically, WPB reported. Use of "mud", the residue that is a by-product of reclaimed rubber, is not restricted, and is being used for doll-carriage tires. All plastic molding materials as well as scrap cellulose acetate are still under strict allocation, WPB officials said. Some cellulose acetate has been allocated for toys and games, but not phenolic and polystyrene molding powders and urea plastics. The committee's previous recommendation to resume production of metal toys was discussed briefly. The feasibility of making iron and steel available for this purpose is being considered by WPB.

A proposed WPB order establishing uniform procedure in connection with allocated raw materials required in making protective coatings won unanimous approval of the WPB Paint, Varnish and Lacquer Industry Advisory Committee.

Availability of repair parts and service for domestic washing machines were discussed at the April 28 WPB conference of domestic laundry equipment service managers. While demand is rising, and a short supply exists in some localities, the general situation is better than it was a year ago. WPB said synthetic rubber for wringer rollers and drain hose may be expected to appear on the list of essential uses, but the industry was warned that an effort to produce these items in sufficient quantity to build up stocks would probably result in a cut-off of synthetic supply for "rubber is still critical."

Drastically cut output of steam-distilled pine oil in the southern pine district was revealed May 10 by WPB's Chemicals Bureau, which reported that the reduction was due to labor conditions and recent heavy rains and that demands have completely depleted inventories at the various distribution points throughout the United States. Consequently allocation of pine oil for uses other than those of military character cannot be made until inventories are reestablished. The bulk of pine oil produced in this country is distributed to the ultimate consumers from some 200 stock points supplied by tank car shipments direct from the producer, and officials stated it would be uneconomical to replenish the stocks by less than tank-car shipments, even if the drums and labor needed were available. Every effort is being made to reestablish inventories in the stock points as quickly as possible, and steps are also being taken to increase production. Allocations and deliveries under Order M-365 will be resumed as soon as possible, WPB said, in about 60 days. Steamed distilled pine oil is used in the mining industry as a flotator; in the textile industry as a dyeing aid; in the rubber industry as a plasticizer and softener; and in soaps as a disinfectant.

Representatives of the chain industry believe certain chain plants, where manpower is not critical, could produce more tractor tire chains than now permitted without interfering with other essential chain production, the WPB revealed April 28. Demands for tractor chains are now in excess of the quantity permitted under Limitation Order L-201, industry members declared at a joint meeting of the Non-Skid Chain Industry Advisory Committee and the Welded and Weldless Chain Manufacturers Industry Advisory Committee. The present classification of Army truck tire chains as a Class A product has created an excessive amount of paper work during the first quarter, committee members said. Army truck tire chains were made an A product in January. Applications to a claimant agency must be made for materials to manufacture Class A products. A representative of the Wrought Iron Section of the Steel Division of WPB advised the committee that the industry could not expect an increase in the production of wrought iron. This will probably result in a more general use of steel chain.

Suspension notice of Conservation Directive No. 10A—Use of Rubber in Aircraft Storage Battery Monoblocs (September 22, 1943)—prepared by the Operating Committee on Aircraft Materials Conservation, was approved May 10 by joint action of the Army Air Forces, Navy Bureau of Aeronautics, and the Aircraft Resources Control Office, Aircraft Production Board. Directive No. 10A is suspended until further notice since the use of crude rubber for this application is adequately covered by Order R-1. Should it become necessary in the future to reissue Directive No. 10A, it will be reinstated.

Persons making high-tenacity tire-type rayon yarn; cotton, rayon and nylon tire cord; and tire fabrics may use the AA-1 preference rating to obtain maintenance, repair, or operating supplies (MRO) for the conduct of such business. Previously they had been allowed to use the lower AA-5 rating. This action is taken by including this type of production in List 1 of Controlled Materials Plan Regulation No. 5, as amended May 18.

Provisions controlling the use of rubber tires in the manufacture of tank car heaters, pumping boosters or circulators, and bituminous sprayers have been removed from the schedules of the simplification and conservation order covering these items. Schedule IX of Order L-217 (Tank Car Heaters and Pumping Boosters or Circulators) and Schedule XIII of the order Bituminous Materials Maintenance Units, commonly known as sprayer, utility or tank units, limit manufacture to models and sizes specified. Both schedules formerly permitted the use of rubber tires only on items manufactured to fill purchase orders placed by or for the military. Tires are controlled by the ORD, WPB said. Applications for tires are made by manufacturers and approved or denied by the Construction Machinery Division. A certain quantity of tires is earmarked for the division by ORD and is apportioned among manufacturers of all construction machinery at the discretion of the division. It is not possible to predict whether or not tires will be available for equipment covered by Schedules IX and XII manufactured for civilian use, officials said. This depends entirely on the tire supply situation. Both schedules were issued in April, 1943, and except for the deletion of the tire provision made May 15, have not been changed.

Spacer rings, used in equipment for recapping and retreading tires may not be purchased without special approval, under the general maintenance, repair and operating supplies procedure governing purchase of equipment for maintenance, repair, and operating purposes, according to General Limitation Order L-61, as Amended May 10. Formerly spacer rings were included in a special list of tire repair equipment that could be purchased only after approval by a War Production Board field office on WPB Form 1319.

General Limitation Order L-43, as Amended May 5, 1944—Motorized Fire Apparatus—among other changes provides that rubber or synthetic rubber may be used for such equipment only to the extent permitted by R-1 or by any relief granted on appeal taken under that order.

Amendments issued May 6 to Priorities Regulation 19 aid farmers in obtaining available supplies necessary for farm operation. Among the products included are hay stacker cable, grinders for sharpening tools, tire pumps, and also tire pressure gages.

Last month the following orders were revoked and their respective products placed under General Allocation Order M-300: Allocation Order M-170 and Supplementary Order M-170-a—Styrene; Allocation Order M-215—Glycols.

War Food Order No. 60, Amendment 1, effective May 1, which replaces Food Distribution Order No. 60, provides that producers of crude sardine and menhaden oil set aside about one-third of their production for uses classified as essential by the War Food Administration, including manufacture of insulating varnishes, alkyd resins, heat-resistant paint, lubricants, mechanical packing, textile sizes, and natural or synthetic rubber products.

War Food Order No. 35 was amended May 15 to permit the use of rapeseed oil without authorization in marine and heavy-duty engine and pneumatic tool oils and in factice for insulation and the compounding of rubber. For other uses, however, application must be filed for authorization to use it. WFA permitted such use of rapeseed oil since March, 1943, but only upon specific authorization. Stocks now, however, are sufficient to allow its use for these purposes without the necessity of filing application for authority. The amendment also removes mustardseed oil from War Food Order No. 35.

Surplus War Property Administration, Washington, D. C., on April 29 announced a price policy designed to expedite the movement back into production of property left over from termination of war contracts. Such property, already amounting to several hundred millions of dollars, consists of raw materials, semi-finished goods, and scrap, coming to the government from manufacturers whose war contracts are being terminated. Virtually all the materials to be disposed of are usable only for manufacturing purposes.

EASTERN AND SOUTHERN

Harvey G. Greer

Pach Bros., N. Y.

Sam Klein

Witco Chemical Co., 295 Madison Ave., New York 17, N. Y., has announced that Harvey G. Greer, lately of the Rubber Reserve Co., Washington, D. C., has joined its technical-service staff to handle its growing line of products for the rubber and synthetic rubber industries. Following his graduation in chemical engineering from Ohio State University in 1929, Mr. Greer was for more than 13 years associated with The Goodyear Tire & Rubber Co., Akron, O., in compound development for tires, tubes, and mechanicals. Then in 1942 he joined Rubber Reserve, where his experience was brought to bear on problems of compounding synthetic rubbers. Mr. Greer will make his headquarters in Continental Carbon's Akron office. Expansion of Continental's service to the rubber industry includes greatly enlarged production of its complete line of carbon blacks. The distribution of all Continental Carbon blacks will be through Witco Chemical Co.

Increases in production of carbon black totaling more than two million pounds monthly were announced May 18 by Robert I. Wishnick, Witco president. Rapid growth of demand for several grades of carbon black for compounding with synthetic and natural rubber requires greater output. Improvements now under way in present plants of Continental Carbon Co. will increase its output of channel process black substantially, and new construction planned will bring the total rise to some 50%. Continental Carbon's new plant at Sunray, Tex., for producing Continex furnace black, a semi-reenforcing grade especially needed for compounding with GR-S synthetic rubber, will be in full operation June 1. Completion of the present building program will give Witco a complete line of industrial carbon blacks of all essential grades.

J. M. Stonnell, comptroller of the Copolymer Corp., Baton Rouge, La., has been elected a member of the Controllers Institute of America, 1 E. 42nd St., New York 17, N. Y.

Mixing Equipment Co., Rochester, N. Y., has transferred James V. Donohoe from the New York office to become assistant sales manager at company headquarters.

Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J., has named Sam Klein western sales manager, with headquarters in Chicago, Ill. Employed in the dyestuff industry since 1907, Mr. Klein was with A. Klipstein & Co. and Read Holliday & Sons before joining Calco in February, 1917. For the past 20 years he was in charge of Calco's lake department. He is also active in the affairs of the New York Paint, Varnish & Lacquer Association, the New York Paint Club, the National Paint, Varnish & Lacquer Association, the Salesman's Association of the American Chemical Industry, the Association of American Textile Chemists & Colorists, and the Drug & Chemical Club of New York.

Mellon Institute, 4400 Fifth Ave., Pittsburgh 13, Pa., is distributing gratis to interested specialists copies of a comprehensive review of the chemistry of cyclopentadiene with particular reference to its industrial applications in the production of plastics and in organic synthesis. In the same publication the properties of dicyclopentadiene are also described.

Texas Rubber & Specialty Corp., 920-30 Adele St., Houston, Tex., which recently suffered a fire loss in a storehouse of about $20,000, the greater portion of which was covered by insurance, is restoring the destroyed structure and also increasing floor space by 20% under an additional building program. As only an isolated building was damaged by fire, manufacturing operations were not affected. The company, however, is operating with a four-month backlog of orders, all essential to the war effort. The firm, which was organized in 1919, manufactures "Okeh Products" for oil field supply stores and also makes mechanical rubber goods and rubber and steel specialties to the specifications of oil tool manufacturers. Officers include H. W. Millmine, president and general manager; T. P. Burns, Jr., vice president, and V. B. Root, secretary-treasurer. The company also maintains an export office, under I. Frank Brown, at 30 Rockefeller Plaza, New York 20, N. Y.

Carrier Corp., Syracuse 1, N. Y., reports that as part of the WPB program to provide sufficient rayon for immediate military needs and for the nation's synthetic rubber tire program, the American Viscose Corp., has expanded its rayon making facilities at Front Royal, Va. This expansion required the installation of four additional Carrier centrifugal refrigeration machines to cool brine. Refrigeration is essential in producing rayons from cellulose. Brine is circulated to the soda, mercerizing, churn mixing, and viscose aging departments. Regulation of temperature is vital in these operations to control chemical processes and produce a standard high-grade rayon tire cord. The new centrifuges, driven by a steam turbine, have a combined cooling capacity of 1,500 tons when lowering the temperature of brine from 17° F. to 10° F.

Carrier refrigerating machines from the Municipal Auditorium, New Orleans, La., Mandel Bros., Chicago, Ill., Gimbel Bros., New York, N. Y., and G. Fox, Hartford, Conn., with a total capacity of 1,960 tons formerly used to cool auditorium audiences and department store shoppers, have been installed at the Neches Butane Products Co., Port Neches, Tex., to reduce the heat of gases in the butylene fractionating towers during the production of butadiene for synthetic rubber.

Appointment of Harry M. Iverson as comptroller of Carrier Corp. was revealed May 8 by President Cloud Wampler. Mr. Iverson formerly was with Arthur Andersen & Co., New York, N. Y. Vice President F. F. Hoyt, who formerly also served as comptroller, has been made chief financial officer of the corporation by the board of directors.

The Glenn L. Martin Co., Baltimore, Md., announces the development of Flight Floor, a non-skid, fire and abrasion coating. Its principal ingredients are "Thiokol" and ground cork. The coating, which has been tested in Mariner and Marauder planes, is applied at room temperature with an open nozzle paint spray gun. It weighs only 47.5 grams per square foot, compared with 232.1 grams for rubber matting previously used. Flight Floor is reported to have flexibility and resiliency at temperatures from –20 to plus 160° F. It is resistant to gasoline, oil, aromatic fuel, salt water, deicer and hydraulic fluids, and oxidation. Its adhesion to metal, plywood, and painted surfaces is good, and it is easy to repair in the field.

Armstrong Tire & Rubber Co., Natchez, Miss., according to W. A. Moore, vice president and general manager, is constructing a new two-story concrete building, 133 by 330 feet, to house green tire storage, curing, bagging and debagging, and final finish operations. Special ventilation features are being installed to reduce the temperature of the curing room to make for greater comfort and efficiency. The new structure, to cost approximately $350,000, will be completed about July 15.

Glyco Products Co., Inc., Brooklyn, N. Y., through Vice President E. Rosendahl, has announced the appointment of Eugene McCauliff as technical sales director. Dr. McCauliff, a graduate of Fordham University, has been associated with Duff Chemical Co., Industrial Synthetics Corp., and Hooker Electrochemical Co. In his new position, he will devote his time to the technical sales development of the esters, synthetic waxes, emulsifying agents, etc., manufactured by Glyco.

U. S. Rubber Appointments

Willard H. Cobb and George M. Tisdale on May 3 were elected vice presidents and members of the executive committee of the United States Rubber Co., 1230 Sixth Ave., New York, N. Y. Both men are also directors of the company. Mr. Cobb was general manager of the mechanical goods, general products, and "Lastex" yarn and rubber thread divisions. He joined the company in 1914 as a salesman. Mr. Tisdale, formerly director of purchases, entered the purchasing department in 1920.

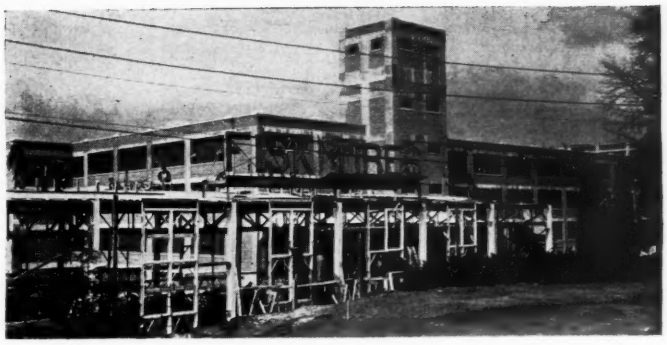
Ernest G. Brown has been named general manager of mechanical goods, general products, and "Lastex" yarn and rubber thread divisions of U. S. Rubber, to succeed Mr. Cobb. Mr. Brown, a native of New Haven, Conn., and a graduate of Sheffield Scientific School at Yale University, served in the Army in World War I. He joined the rubber company in 1929 in the central planning and engineering department in New Haven, was subsequently transferred to Bristol, R. I., as assistant factory manager, and in 1931 became factory manager. Later Mr. Brown served as production manager for the six plants manufacturing general products, druggists' sundries, insulated wire, and mechanicals. Then in 1942 he was named head of the shell loading division, when that department was organized, and a year after was made general manager of the munitions division supervising production at the seven plants operated by the company.

Russell Hopkinson has been appointed director of the company's newly formed commercial development department, which will act as the focal point for consideration of new businesses, new ideas, and products submitted to the company. It will also investigate and recommend new fields for company expansion and will study economic trends as they affect the company's diversified activities.

C. W. Higbee, manager of the wire and cable department, has announced the appointment of Alexander S. Basil as assistant factory manager of the Lowell, Mass., plant. Mr. Basil, a graduate of Rensselaer Polytechnic Institute, started with the company in the wire and cable department at Bristol, R. I., as process engineer on July 19, 1926; he was promoted to assistant chief wire inspector on March 1, 1927, during 1929 became technical superintendent, and in 1934 was transferred to the general offices in New York.

On May 1, H. M. Ramsay became sales manager, tractor and implement tire division of U. S. Rubber, with headquarters at Detroit, according to J. W. McGovern, general manager of the tire division. Mr. Ramsay, who had joined the rubber company in 1935 as oil company sales representative, was made assistant district manager at Baltimore the following year, then was transferred to Chicago as district manager, in 1941 was brought to New York as assistant sales manager of the Fisk tire division, next was transferred to Detroit as division manager in charge of fuel cell production, and in December, 1943, returned to his former position as assistant sales manager of Fisk.

I. L. Cantwell, production manager of the company's Bristol plant, was made sales manager of battery separators. He started with the company as a cost clerk on March 27, 1922, becoming successively estimator in the wire cost department, assistant production superintendent, and production manager of the Bristol plant.



New U. S. Rubber Tire Building at Fisk Plant

Arthur Nolan, sales manager of Dispersions Process, Inc., and the latex, Lotol department, Naugatuck Chemical Division, U. S. Rubber, has reported the reopening of the New England branch office at 560 Atlantic Ave., Boston, Mass., under the managership of S. Brown, who will be in charge of the New England territory. As the Naugatuck representative, Mr. Brown will concern himself with the technology of *Hevea*, synthetic rubber latices, and artificial aqueous dispersions of reclaimed rubber, vinyl resin, and similar materials, and their use in adhesives, coatings, and saturants. He will also handle GR-S latex compounds, which are becoming available in increasing quantities and more numerous types. Mr. Brown, a graduate of the University of South Carolina in 1924, then went to Sayles-Biltmore Bleacheries as chemist in charge of control and development laboratories. He later did research and production engineering with National Aniline & Chemical Co. and Alex Herz Co., and later worked with the Union Paste Co. and Stahl Finish Co., handling technical development and production problems dealing with adhesives and coatings of both the water and lacquer types.

Howard E. Malcomb has been put in charge of farm and heavy-service tire activities for the Fisk division, according to J. C. Ray, Fisk sales manager. Mr. Malcomb first joined the company in 1915 as a stock clerk in the San Francisco branch and rejoined it in 1919 after serving in World War 1, becoming a salesman in 1923, assistant to the tire sales manager in San Francisco in 1927, assistant district manager in Boston in 1933, and then district manager in Oklahoma City. Made manager of the company's truck tire department in 1939, Mr. Malcomb later became assistant to the general sales manager of U. S. Rubber's tire division and was named manager of sales production coordination in 1942, which position he held until his recent appointment.

Michael Fenga, assistant art director for U. S. Rubber has been named acting art director to succeed H. A. Donderi, granted a military leave of absence.

Herbert E. Smith, president of U. S. Rubber, was elected chairman of the board of Dominion Rubber Co., Ltd., Montreal, P. Q., its Canadian subsidiary, succeeding F. B. Davis, Jr. Dominion Rubber consists of nine factories in the Provinces of Ontario and Quebec, which produce lifesaving jackets and rafts, tank tracks, tires and tubes for planes and combat vehicles, footwear and clothing, molded and plastic parts for tanks and planes, gas masks, self-sealing fuel cells, small-arm ammunition, special chemicals, and a wide range of other articles vital to the Armed Forces. In peacetime these plants manufacture products closely paralleling those made in factories of U. S. Rubber.

Expansion Program Progressing

Plans for construction of a new control and development laboratory were announced May 15 by officials of the Los Angeles, Calif., plant. The new laboratory, to cost approximately $20,000, and scheduled for completion in August, will be in a central position in the present factory building. Analytical and testing units formerly scattered throughout the plant will be integrated into one enlarged department; while additions of new equipment will nearly double facilities. A specially designed fabric testing room will be equipped to control temperature and humidity automatically, enabling chemists to establish any desired atmospheric condition. The entire department will be air-conditioned and air-controlled. Staff personnel, which now includes 128 chemists, development engineers, and specialists, will be augmented in proportion to the increased facilities and floor space.

C. A. Neville, head of the department, explained that intensified research due to changing conditions and multiplied problems in the use of new materials made this expansion desirable, which coincides also with a general expansion program that, when completed, will almost double production capacity of the Los Angeles plant.

Rapid progress is being made in the huge building expansion program taking place at the company's Fisk tire plant at Chicopee Falls, Mass. As various building units are completed, tire machinery is being installed, and it is expected that by July, production will be at full capacity.

The company further reports that construction at its Eau Claire, Wis., plant being reconverted to tire production is proceeding according to schedule with operations to resume the end of June or early in July; capacity output of rubber tires, exclusively for military and farm use, is expected shortly thereafter.

New Products Developed

A fire-resistant asbestos product has been perfected by the company, which eliminates practically all metal from heating and ventilating air-duct systems of aircraft. Also eliminated are welding, die casting, riveting, intricate metal processing, pattern making, leather and fabric pipe covering and metal forming, previously all essentials in the air-duct systems. Made of fabric, asbestos, and a synthetic coating of resin, Multiflex, as the new development of U. S. Rubber is known, makes possible the lightening of the material used on these air-duct systems by more than 10%.

Collapsible Emergency Aircraft Cargo Container

The simplicity of construction and the ease of application and installation of this new system allows this material to be formed into radii and intricate angles and shapes for fittings in a matter of minutes. It completely excludes the taking of patterns and the bending and fitting of joints and elbows with strategic materials. These systems are assembled and cemented together with a special synthetic rubber compound. Hand-sewn materials and bellows previously employed in some parts of aircraft production contained as many as 25 to 30 corrugations each. These units are now turned out in three minutes by employing Multiflex. Before this substitution the time necessary for manufacture was more than one-half hour per single unit.

Other uses also have been found for this type of flexible unit. Machine gun shell ejection chutes have been developed; while a special system has been devised whereby bombsights are kept at exact temperatures to insure proper workings at all times. One major aircraft company, moreover, is using this material in a special system in its vital motor testing laboratory. Other companies are employing this Multiflex duct in many forms for air and ventilator systems. The use of this type of material during the postwar period will, it is believed, alleviate many of the anticipated bottlenecks which will be paramount in home and office buildings, trains, buses, ships, and commercial airplanes on heating, ventilating, and also air-passage duct systems.

Discovery of this method of forming without using highly strategic materials was made while scientists of the company were seeking a method of manufacture applicable for Army gas mask hose, which did not require a wide reenforcement coil.

U. S. Rubber has perfected collapsible emergency aircraft cargo containers for transporting dangerous corrosive acids that eliminate possibility of spillage of acid from accidental breakage while in transit and consequent seepage of acid into frames of planes with attendant damage thereto. These containers come in flexible disk form, 56 inches across, and assembled on two parts in sheet form. One is a light cotton fabric treated with vinylite; the other is coated with synthetic rubber. These are held together with small eyelets about three inches apart and stapled into the material; through these is drawn a lightweight cord. The completed article is then ready to be placed around the container holding the acid, etc., and drawn tight to insure against spillage. A flexible hose is inserted into a rubber disk placed into the top of the container before the drawstrings are entirely tightened. In case of breakage of the container actually holding the liquid, the acid fumes are carried off through the tube, thereby dispelling any possibility of damage from fumes.

New Activator for Thiazole Accelerators

A NEW activator for thiazole accelerators, which may be used to replace existing activators, may be used as an aid in using straight thiazoles and self-activated thiazoles interchangeable or as an aid in reducing the dosage of thiazole to a minimum and thereby improving aging properties. This new material, called Activex, is a thin syrupy liquid with a specific gravity of 1.115. It is reported that the modulus curve of the unaged stock containing Activex is remarkably flat on the overcured side. A plant for the production of Activex recently was completed at Huber, Ga. J. M. Huber, Inc., 460 W. 34th St., New York 1, N. Y.

I. B. Kleinert Rubber Co., 485 Fifth Ave., New York, N. Y., held on May 20 an all-day outing at Bear Mountain, attended by 212 employes, including office workers and salesmen from nearby territories. Ninety-one employes were awarded pins commemorating their 10 years or more of service. Honor guests were Louis Solomon and Horace G. Wilcox, sales representatives, both of whom were given diamond studded pins marking their 50 years' service. Frank Lamb, manager of the Chicago office and Midwest salesman, Richard A. Cody, New England sales representative, and Hillar Mayer, head of the New York office shipping department, each received pins commemorating 40 years or more of service. Six service men were included in the 91 with 10 or more years of service, and their pins are being held for them. At the luncheon assembly, Arthur Salinger, secretary of the company, was also presented with a desk clock by employes, marking his 25 years with the company. Kleinert directors gave Mr. Wilcox an inscribed watch, and Mr. Solomon a leather-bound parchment, signed by 100 working associates.

The Kelly-Springfield Tire Co., Cumberland, Md., recently announced the fiftieth anniversary of the first Kelly tire built in 1894. The conversion of the company plant from munition making to synthetic tire processing is proceeding steadily. Production is expected nearly to double the prewar peak.

Columbian Carbon Co., New York, N. Y., held its annual meeting April 25 at which President Reid L. Carr reported sales for the first quarter this year were 15% above the 1943 figure. He also said that production of carbon black was 50% above that of a year earlier; on the basis of this first-quarter figure 1944 output should reach 180 million pounds with 220 million pounds anticipated for next year.

United States Treasury Department, War Finance Committee for New York, 1270 Sixth Ave., New York 20, N. Y., last month announced formation of the advisory committee of the Commerce & Industry Division's Fifth War Loan Drive, including among its members John A. Brown, president, Socony-Vacuum Oil Co.; Cleveland E. Dodge, vice president, Phelps Dodge Corp.; and Herbert E. Smith, president, United States Rubber Co. Messrs. Brown and Dodge are also co-chairmen of the industry section, one of the sections set up within the division. The Fifth War Loan Drive, with a national goal of $16 billion, will run from June 12 to July 8.

H. Muehlstein & Co. Inc., dealer in rubber, scrap rubber, and plastics scrap, 122 E. 42nd St., New York 17, N. Y., at a recent stockholders' meeting elected William J. McCauley president to succeed Herman Muehlstein, now chairman of the board. Mr. McCauley has been with the Muehlstein firm 27 years. Prior to his election to the presidency he served as vice president and before that as secretary. Until recently he was administrative assistant in charge of scrap rubber operations for the Rubber Reserve Corp. Mr. McCauley was born and educated in New York, N. Y. He makes his home at Belle Harbor, on L. I., and is a member of the New York Athletic and Sewane Harbor clubs.

Carlisle Tire & Rubber Co., Carlisle, Pa., has announced the appointment of Furber Marshall, president of the Pharis Tire & Rubber Co., Newark, O., as president and chairman of the board of the Carlisle company. Also named a director was R. W. Atkins, of Shearson, Hammil & Co., New York, N. Y. The Carlisle operations were recently purchased by the Pharis organization as another step in the Newark company's program of diversifying its production and distribution of related automobile items.

Pittsburgh Plate Glass Co., Columbia Chemical Division, Barberton, O., has selected the trade name "Allymer" for the complete line of allyl resin monomers formerly known as Columbia resins and designated as C. R. 39, etc. The numbers such as 39 and 149 will be continued to designate types. A series of bulletins describing various types and phases of Allymer will be distributed from time to time.

Foster Dee Snell, head of the consulting firm of Foster D. Snell, Inc., 305 Washington St., Brooklyn 1, N. Y., as the speaker of the evening addressed the annual meeting of the student affiliate of the American Chemical Society at Hofstra College on "Opportunities in Chemistry and Chemical Engineering."

Frank Moody Biffen, for 15 years on the Snell staff, was recently elected to Fellowship in the Institute of Chemistry of Great Britain and Ireland. Mr. Biffen, in his association with Foster D. Snell, Inc., started as chemist in the analytical laboratory and progressed successively to positions as chief chemist, director of the analytical department, and most recently to account executive.

Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N. Y., on May 22 reported election of the following presidents of subsidiaries: Joseph G. Davidson, of Carbide & Carbon Chemical Corp. and Carbide & Carbon Chemicals, Ltd.; James W. McLaughlin, Bakelite Corp., who will also direct all plastics operations of units of the corporation, including the plastics division of Carbide & Carbon Chemicals; Stanley B. Kirk, The Linde Air Products Co., The Prest-O-Lite Co., Inc., Dominion Oxygen Co., Ltd., and Prest-O-Lite Co. of Canada, Ltd.; Arthur V. Wilker, National Carbon Co., Inc., and Canadian National Carbon Co., Ltd.; Francis P. Gormely, Electro Metallurgical Co., Electro Metallurgical Co. of Canada, Ltd., Haynes Stellite Co., Michigan Northern Power Co., and Union Carbide Co. of Canada, Ltd.; John D. Swain, Electro Metallurgical Sales Corp.; John R. Van Fleet, United States Vanadium Corp. and Union Mines Development Corp.

OHIO

Goodyear Appointments

Return of J. E. Mayl, vice president of The Goodyear Tire & Rubber Co., Inc., Los Angeles, Calif., to Akron as head of the company's tire sales division occurred last month. Reporting to Mr. Mayl in his new capacity will be the company's five division sales managers and the following three men: C. C. Osmun, appointed manager of trade relations with full responsibility for the company's trade relations in the tire industry as well as with government rationing and pricing agencies; Victor Holt, former assistant manager of the tire department, who now heads that organization, having under his supervision automobile, truck and tractor tires and petroleum sales and service department activities; and D. R. Mackenroth, manager of the retail stores division, who will include associated merchandise in his new assignment. Manager of associated merchandise, including car and home supplies, battery and brake department, is H. G. Harper; while Carl Crafts, former manager of the dealer department, is now manager of the retail stores. Mr. Mayl was in his California post since 1937. Previously he had been assistant sales manager in Akron. With Goodyear since 1925, when he joined the truck tire sales organization, he was made manager of that department in 1928, was appointed manager of the southern division in 1929 and sales manager of the tire department in 1931.

Goodyear has established a new synthetic sales division to explore the possibilities for postwar sales, with C. P. Joslyn its head. Aiding him are H. R. Thies, manager of plastics and chemical sales; A. F. Landefeld, manager of Pliofilm sales; O. C. Pahline, director of flooring sales; and H. D. Herbert, Airfoam sales head. Mr. Joslyn, with Goodyear since 1926, was mechanical goods sales manager for the eastern division from 1931 to 1941 and has since directed fuel tank contracts under the war program.

Coincident with Mr. Joslyn's appointment came the announcement that synthetic rubber latex, in drum lots and in three varieties, now is for sale. This was made known with the company's appointment by the government as a synthetic rubber latex distributer. According to Mr. Thies, the three available varieties are suitable replacements for natural rubber latex in the treatment of cotton and rayon tire cord, among other usages. All proposed synthetic rubber latex purchases must have the approval of the Rubber Reserve Co. before delivery.

The recently created plastics and chemical sales division, headed by Mr. Thies, had been formally announced April 27 at a reception at the Commodore Hotel, New York, N. Y., in connection with the annual meeting of the Division of Rubber Chemistry, A. C. S. Mr. Thies and Robert D. Vickers, assistant manager of the new department, acted as hosts at the reception, which also featured a display of Chemigum, Pliolite, and synthetic rubber latex products.

Leonard T. Ostergren, general foreman of parts manufacturing, Plant D, Akron, has been appointed manager of Goodyear Aircraft's plant in Newark, O., succeeding H. J. Miller, resigned.

Continuing development of its postwar plans in the export field, A. G. Cameron, vice president and general manager of The Goodyear Tire & Rubber Export Co., recently announced the following field representative changes. Russell W. Hadley, manager of the Export mechanical goods department, was named manager of the new Far Eastern division with supervision over China, French Indo-China, Guam, Hong Kong, Japan, Manchuria, Netherlands India, Philippines, Eastern Russia, Siam, and Straits Settlements. Mr. Hadley, a member of the Export staff since 1915, has served as representative in the Far East and in 1934 became managing director for the manufacturing company in Java. Mr. Hadley, with other members of the Goodyear-Java organization left the island only a few hours before the Japanese took over early in 1942. K. E. Barton, former manager of the mechanical goods sales department for Goodyear-Great Britain and more recently with Goodyear-Canada, succeeds Mr. Hadley as manager of Export mechanicals.

K. S. Chamberlain continues as manager of the remainder of the present Eastern division, including India and Burma, and will also have supervision over Australia.

Other Export changes include naming C. R. Bollinger as vice president in addition to his present position as secretary-treasurer for Goodyear-Argentina, and D. M. Hastings as managing director of the operation besides being vice president.

W. A. Williams, previously a member of the Goodyear-Mexico organization, is en route to Calcutta, India, where he is to be secretary-treasurer for Goodyear-India, to succeed the late R. J. Schubert.

D. S. Wylie, who joined Goodyear a short time ago as a mechanical goods representative in New York, is en route to India to join the India sales organization. Mr. Wylie was former manager in Manila for the Singapore Rubber Works and more recently was with the Rubber Development Corp. in South America.

M. S. Meyer, a member of the comptroller's foreign department at Akron since September 1942, has been named assistant managing director for India. He has been with Goodyear since 1927, and most of his service has been overseas in Europe and New Zealand.

On May 13 Goodyear's "Hook'n Ladder Follies" radio show (11:00 a.m. EWT, every Saturday) moved to Hollywood and with a new cast and new format became "Andy Devine's Dude Ranch."

Northern Model of Goodyear Portable Home

Expansion Plans Continuing

Goodyear Decatur Mills, Decatur, Ala., plans completion by August 1 of a one-story addition, 280 by 360 feet, with floor space of about 100,000 square feet, to cost, with equipment, $1,250,000. Hiring of 250 new workers is anticipated. The company in March completed a one-story building, 280 by 320 feet, including about 140,000 square feet of floor space, which cost, with necessary equipment, $1,247,000. Employes here also number 250. The mills are manufacturing rayon tire fabric for special military uses. C. W. Young is superintendent.

Expanding its facilities for manufacturing mechanical rubber goods, the Goodyear Tire & Rubber Co., Akron, announced recently that production of hose and certain other products has been started in its Los Angeles, Calif., plant, which was completed in 1920, with tires as the principal product. Vice President Mayl disclosed that this new mechanical goods unit eventually will make a wide variety of molded rubber articles including rubber soles, besides hose and similar industrial equipment.

A subsidiary of the main Goodyear mechanical rubber goods plant in Akron, the unit in California was necessitated by the constantly increasing demand for Goodyear industrial rubber products among West Coast industries, according to W. C. Winings, manager of Goodyear's mechanical goods division.

When this new California unit started in operation, its first product was a length of rubber suction hose of special synthetic rubber construction for use in the recently opened synthetic rubber plant in Los Angeles which Goodyear is operating for the Rubber Reserve Co.

Goodyear is constructing an addition to its employes' cafeteria building at its plant at 12901 S. Vernon Ave., Los Angeles, to cover 11 by 32 feet and cost $4,000.

Wingfoot Homes, Inc., another Goodyear subsidiary, formed to construct portable prefabricated housing, especially for the postwar period, is erecting a factory on land of Goodyear Farms, Inc., near the Goodyear Aircraft Corp. factory at Litchfield Park, Ariz.

Mr. Winings recently announced also that Goodyear steel cables are now used between the power units and the rear wheels of 150-pound Army motorcycles dropped with paratroopers from planes. These are the only motorized vehicles that can be released from a plane with only one standard 24-foot canopy chute. The belts are the same type and construction as those used in the engines of armored equipment. Advantages of the V-belt drive are that the steel-cable belt dampens vibration, produces a resilient flow of power, requires little adjustment for tension, transmits a high percentage of power over a long period without servicing or repairs, and never requires cleaning or oiling.

Mr. Winings also announced a complete

line of belts adapted to meet the exacting conditions in the production of coal. The composition of the belts features a material to delay deterioration from sulphuric and other acids encountered in mine operation. A "Troughing Index" has been adopted to provide advance selection of belts neither too limber nor too stiff for needed requirements. The new line of belts will be named later. Goodyear "SS" synthetic rubber conveyer belts are said to be on a par with the best prewar belts in abrasion resistance, lack of cut growth, and flex and adhesion, qualities important for coal mine belts.

Wilson Talks on "Rubber—Today and Tomorrow"

In an address before the Sales Executive Club of New York on May 2, Robert S. Wilson, Goodyear vice president and general sales manager, discussed "Rubber—Today and Tomorrow." Mr. Wilson began by reviewing the rubber situation from January, 1940, to Pearl Harbor, and in his description of the happenings of this period he paid tribute to Secretary of Commerce Jesse Jones for his efforts in building up our stockpile of natural rubber to 634,000 long tons when Singapore fell. The speaker then mentioned the tremendous effort involved in building our present synthetic rubber industry, with special reference to the problem of deciding from among the available data from various sources in this country on synthetic rubber the best method of production and the type of rubber or rubbers to arrange to produce within the time that could be allotted. Regarding the final decision reached, Mr. Wilson said,

"The government put down a three-quarter-billion dollar bet that those representatives of rubber, petroleum and chemicals were right. . . . Last summer those plants began to function . . . just a few tons at first, then more and more. Today, two years *after* the fall of Singapore our supply of natural rubber is down to 125,000 tons again, just where it was in January, 1940, *but*—this year those synthetic plants will turn out nearly 800,000 tons of rubber, as much as we ever used in any normal prewar year."

The speaker then devoted most of the rest of his talk to trying to give his audience answers to four questions in which he said he felt they were probably most interested. These questions were: How good is synthetic rubber? How does its cost compare with natural rubber? What will happen to the synthetic rubber plants after the war? What new products are going to be developed out of synthetic rubber? The answer to the first question Mr. Wilson said was that synthetic rubber was good enough. Already 11,000,000 synthetic passenger tires have been made of 100% synthetic rubber and against natural rubber tires they were rated as 96% as good. Truck tires of synthetic rubber still require further improvement, and in the meantime every truck owner literally holds his truck tires in trust for the nation, it was stated. The cost of synthetic rubber today at 42¢ a pound does not compare very well with natural rubber at 12¢ a pound before the war. Although postwar costs for synthetic rubber have been estimated at 12 to 15¢ a pound before depreciation, the final answer is dependent on many factors, and no very definite conclusions can be made at this time. Mr. Wilson cited three reasons why he felt that the synthetic rubber plants, or at least most of them, would probably continue in operation after the war. First, he declared, there has never been a case where a big chemical industry has been built and put into operation and then abandoned. Second, America will never again let herself become so vulnerable in the matter of this essential material—rubber, either as to supply or price. Lastly, since synthetic rubber is a plastic, in the age of plastics ahead of us no one can foretell what uses may be found for this unique substance, either alone or in combination with other plastics.

Drawing his conclusions from developments in the tire industry, the home refrigerator industry, the radio industry, the electrical appliance industry, and many other American industries that have grown so rapidly since the end of World War I, Mr. Wilson emphasized that rubber finds its way into every industry and that we have only had a few years to work with synthetic rubber as compared to 100 years work with natural rubber.

"Give the chemists twenty years to work with the components of synthetic, plus the components of natural rubber, and you have an almost boundless field for development," he concluded.

Goodrich Announcements

Felix G. Tanner has been named factory manager of the Cadillac, Mich., plant of The B. F. Goodrich Co., Akron, according to Vice President T. G. Graham. Mr. Tanner succeeds Robert W. Ransom, resigned. Born in Indiana, Mr. Tanner attended Indiana State Normal College and served in the army during the last World War before entering the rubber business nearly 25 years ago. He came to Goodrich in 1932 and became a shift foreman in 1937. Since 1941 he has acted in various departments in the Akron plant as general foreman until his recent promotion.

Appointment of six regional supervisors for recap plant operations were announced last month by E. E. Arrington, manager of Goodrich recap plant operations: E. F. Cavanaugh, New York, Albany, Philadelphia, Washington districts, headquarters, New York; Sigmund Uyldert, Buffalo, Cleveland, Pittsburgh districts, headquarters, Akron; M. W. Platt, Minneapolis, Omaha, Kansas City, and Denver districts, headquarters, Omaha; C. R. McEntire, Charlotte, Atlanta (headquarters), and Jacksonville districts; P. C. Ickes, Los Angeles (headquarters), San Francisco, and Seattle districts; and L. F. Sonderman, Detroit, Cincinnati, Chicago, Memphis, and St. Louis (headquarters) districts.

William S. Richardson, general manager of the chemical division, has disclosed the creation of a true colloidal latex of one of the company's GEON vinyl chloride resins in water without the use of organic solvents. The GEON dispersion resembles rubber latex in appearance. At the end of the drying cycle, the latex solids are fused almost instantaneously at temperatures of 275 to 300° F. to yield flexible, tough, stable, and resistant coatings or films. GEON resins in latex form allow utilization of all the advantageous properties of the vinyl resins without the expense and hazards of flammable and toxic solvents necessary in other methods, permit use of much existing equipment which cannot handle other forms of vinyl resins, and eliminate expensive recovery systems required for resins applied from solution. Some of the organic solvents, such as methyl ethyl ketone, used in older methods are extremely critical materials. Hence this water-borne, film-forming resin has a timely emergency value. The latex, in clear or colored form, can be brushed, sprayed, or dipped. Improved pliability, more thorough impregnation, and greater adhesion of the fibers are obtained than in previous methods of vinyl use. Resistance to flame and increased wear are imparted to materials on which it is applied. Resistance to age and chemicals, non-toxicity, flexibility, heat-sealability, and greaseproofness make papers treated with the latex useful for packaging foods, chemicals, oils, and greases. It may replace rubber latex in the insulation of electrical wire and cable by the dipping process. Other potential applications include coating of textiles and the manufacture of gloves and other products in which latex has been used. The new latex is under WPB allocation, but quantities for experimental use are available.

Preparing for postwar expansion in chemistry, Goodrich on July 1 is moving the executive, sales, and development departments of its chemical division from Akron to the Rose Bldg. in Cleveland. About 125 persons are involved.

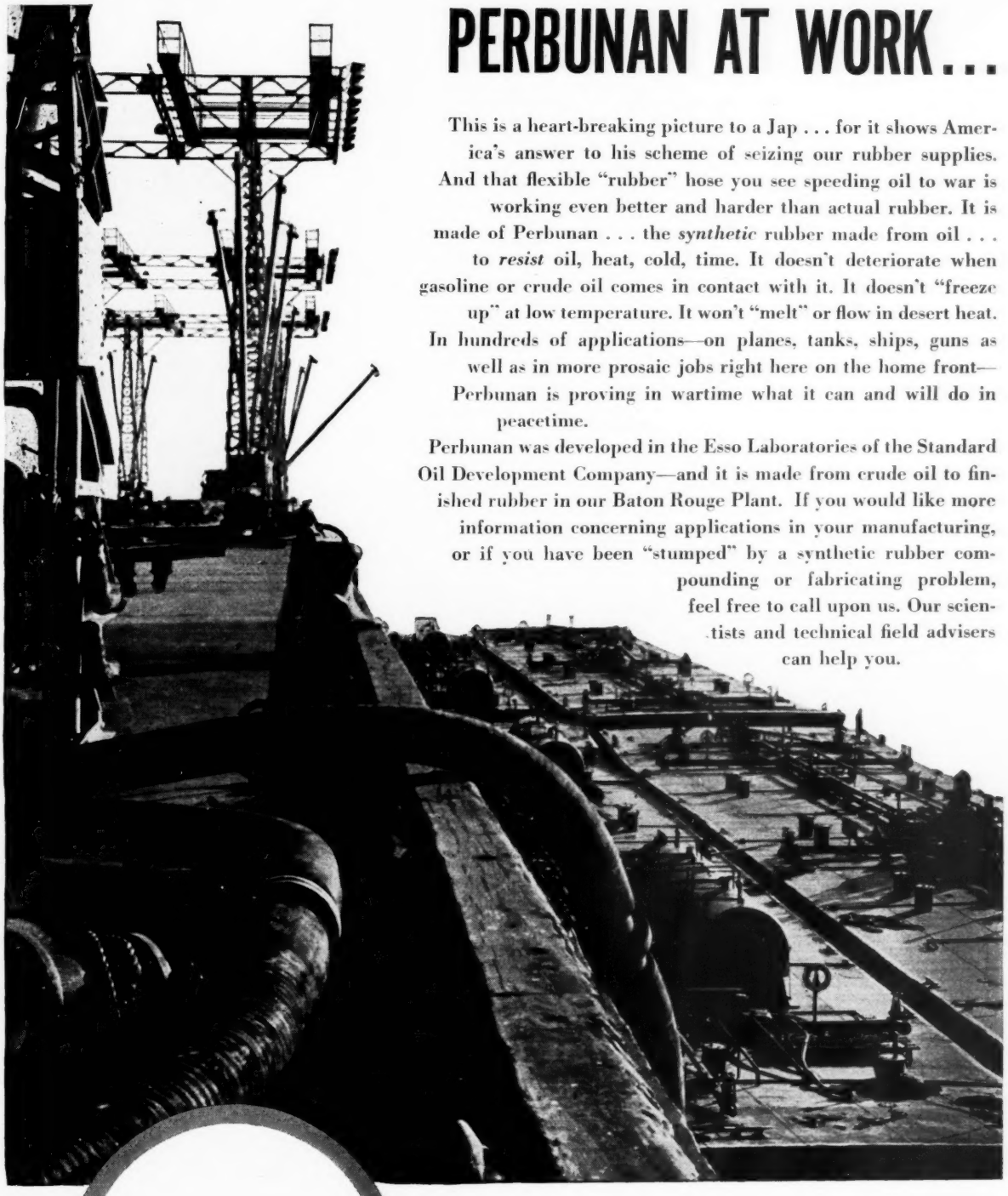
Eric Bonwitt, dealer in used and new machinery for the rubber and plastics industries, 87 S. High St., Akron 8, recently received his final naturalization papers and became a citizen of the United States. Mr. Bonwitt in May, 1938, immigrated from Europe, where he had been in business in machinery and raw materials for the rubber industry since 1902.

Seiberling Rubber Co., Akron, through H. P. Schrank, vice president in charge of production, has announced the appointment of Raymond P. Allen to the development staff, where he has been assigned to development and study of improved cotton, rayon, nylon, and other fibers for use in tire carcasses. Mr. Schrank pointed out that this extensive study of a comparatively unexplored field is necessary because of conversion to the use of synthetic rubbers in tire manufacture, requiring improved tire cord fabrics. A former research chemist for The B. F. Goodrich Co., Dr. Allen was for the past three years manager of the plastics division of the National Rubber Machinery Co., Akron. He attended Colgate and Cornell universities and received his Ph.D. in chemistry and physics from Cornell in 1925. He served in the Army's chemical warfare service during the first World War and is a member of the American Chemical Society.

The Philadelphia Rubber Works Co., manufacturer of reclaimed rubber, Akron, through Vice President Allyn I. Brandt has announced the appointment of Jack H. Rines as a representative on its technical sales staff. Mr. Rines has a background experience in the rubber field gained with the dispersions division of the Flintkote Co., New York, N. Y., and recently was manager of reclaiming operations at the Essex Rubber Co., Trenton, N. J.

Firestone Tire & Rubber Co., Akron, recently has presented Princeton University's department of aeronautical engineering with an autogiro, to be used as a flying laboratory for research on rotary wing aircraft. The machine was made by G & A Aircraft, Inc., a Firestone subsidiary, at Willow Grove, Pa.

Firestone has received a building permit for an addition to the boiler house at its plant at 2525 Firestone Blvd., Los Angeles, Calif., to cost $6,900.



PERBUNAN AT WORK...

This is a heart-breaking picture to a Jap . . . for it shows America's answer to his scheme of seizing our rubber supplies. And that flexible "rubber" hose you see speeding oil to war is working even better and harder than actual rubber. It is made of Perbunan . . . the *synthetic* rubber made from oil . . . to *resist* oil, heat, cold, time. It doesn't deteriorate when gasoline or crude oil comes in contact with it. It doesn't "freeze up" at low temperature. It won't "melt" or flow in desert heat. In hundreds of applications—on planes, tanks, ships, guns as well as in more prosaic jobs right here on the home front—Perbunan is proving in wartime what it can and will do in peacetime.

Perbunan was developed in the Esso Laboratories of the Standard Oil Development Company—and it is made from crude oil to finished rubber in our Baton Rouge Plant. If you would like more information concerning applications in your manufacturing, or if you have been "stumped" by a synthetic rubber compounding or fabricating problem, feel free to call upon us. Our scientists and technical field advisers can help you.

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REG. U. S. PAT. OFF.

THE SYNTHETIC RUBBER THAT RESISTS OIL, COLD, HEAT AND TIME

Write STANCO DISTRIBUTORS, Inc.
26 Broadway, New York 4, N. Y.
Warehouse stocks in New Jersey, California and Louisiana

The General Tire & Rubber Co., Akron, last month through Vice President L. A. McQueen announced appointment as southwestern division manager of Ward A. Morse being transferred from the branch managership at Kansas City, where he will be replaced by L. L. Higbee, store manager in Billings, Mont. Three branches will be operated under Mr. Morse's direction. A. B. Nichols, territorial representative in Jackson, Miss., has been named Dallas branch manager. The Memphis branch is being reopened under the management of John S. Walker, who represented General in the San Antonio area. A new branch has been established at Houston, with Harry Whitesell, Oklahoma territorial representative, as manager. The promotions are part of the postwar sales program being set up by Mr. McQueen.

The Timken Roller Bearing Co., Canton, has organized a subsidiary, The Timken Roller Bearing Co. of South America, Sao Paulo, Brazil, to service the millions of Timken bearings now operating in South America—and to anticipate a great postwar acceleration of industrial growth there. After the war the new firm will handle engineering development of Timken products in the Latin American countries. In describing the move, Whitley B. Moore, Timken general sales manager, said that in the past the company conducted its business there through South American distributers. Jules A. Morland, former New York representative for the company, is manager of the South American subsidiary and is now in Sao Paulo. As part of its organization program, Timken now has two young Brazilian engineers, Murillo Garcia Moreira and Jose Marianno Chaves, in its Canton plant, where they are familiarizing themselves with the engineering production and application of Timken roller bearings and steel. They are later to spend a period of time in the Mt. Vernon plant where rock bits are manufactured.

MIDWEST

Export Seal Program

The Meyercord Co., decalcomania manufacturer, Chicago 44, Ill., in cooperation with the Office of War Information, is releasing a full-page color ad to 30 trade publications during May and June featuring OWI's new Export Seal program for non-Lend-Lease exports. According to OWI, manufacturers of other nations have long enjoyed government sponsored identification programs in foreign markets. Now, for the first time in our export history, a concerted official effort is under way to provide the same service to United States exporters. By use of the new red, white, and blue official Export Seal, OWI points out millions of non-Lend-Lease articles now exported to foreign nations can be uniformly identified as "imported from the United States," a basis for wartime and postwar goodwill and publicity. The seal can be used in any shape or size, in any language—separately or combined with a manufacturer's regular trademark or nameplate. While OWI does not supply the seals, as their purchase is left to a source of supply of the manufacturer's choice, OWI does, however, supply translations in

Official Export Seal

any language and the basic design. Although the use of the seal is voluntary, in view of increasing country-of-origin identification competition from other foreign competitors, OWI anticipates an enthusiastic cooperation from exporting manufacturers in the United States.

To facilitate the program, Meyercord is offering to prepare decalcomania sketches of manufacturer's nameplate combined with the Export Seal where lasting identification is desired on equipment and other non-consumable goods.

Full information regarding the Export Seal program may be obtained by writing to the Special Promotion Division, Office of War Information, 250 W. 57th St., New York (19), N. Y.

Monsanto Advances Several

Monsanto Chemical Co., St. Louis, Mo., on May 1 made Felix N. Williams, production manager of the phosphate division, Anniston, Ala., general manager of the plastics division at Springfield, Mass., to succeed the late John C. Brooks. Mr. Williams was born in Jackson, Ala., in 1901. He attended school in Mobile, the University Military School, and the University of Virginia. While still an undergraduate in chemistry, he served as a laboratory instructor. Following his graduation in 1923, he was employed by the Swann Chemical Co., later acquired by Monsanto.

Succeeding Mr. Williams at Anniston is E. A. O'Neal, Jr., plant manager of Monsanto's Trenton, Mich., plant since September, 1940. He in turn is succeeded by James A. Wilson, assistant plant manager of the Trenton plant since September, 1942. Both Mr. O'Neal and Mr. Wilson began their careers with the Swann Corp.

The appointment of Neil A. Sargent as assistant research director of the Merrimac division, Everett, Mass., was announced by D. S. Dinsmoor, Monsanto vice president and general manager of the division. Mr. Sargent will share administrative and supervisory responsibilities with A. H. Bump, also an assistant research director, under W. S. Wilson, director of research. Mr. Sargent has been associated with Monsanto and predecessor companies since August, 1917, in engineering and research capacities. Most recently he was in charge of pilot plant operations and inorganic research.

Also announced was the promotion of Robert D. Swisher to serve as group leader in charge of organic chemical research for the Merrimac division. A graduate of the University of Michigan, Dr. Swisher has been with Monsanto since 1934 doing research in organic chemicals.

Reichhold Chemicals, Inc., manufacturer of synthetic resins, chemical colors, and industrial chemicals, Detroit, Mich., through Henry H. Reichhold, founder, owner, and chairman of the board, revealed that at the April directors' meeting M. W. Reece was made vice president in charge of Pacific Coast operations. Besides having general managership of the manufacturing plant at South San Francisco, Mr. Reece will also direct and supervise the branch offices in Los Angeles and Seattle, managed respectively by Frank E. Dillon and T. S. Hodgins. Mr. Reece joined RCI in 1935 and soon after went out to San Francisco as sales service representative, later becoming Pacific Coast sales representative, Pacific Coast sales manager, district manager and general manager of the South San Francisco plant.

NEW ENGLAND

Rhode Island rubber manufacturers reported for March, 6,721 workers, 1.4% under the 6,814 of February, but 29.6% above the March, 1943, figure. Manhours worked during March '44 totaled 275,901, 3.1% under February, but 16.8% higher than a year previous. Payrolls for March totaled $989,000, 16.8% above the $869,000 of February and 153.1% above payrolls in March, 1943. Average weekly wages were $34.42, 1% less than in February and 0.8% less than in March '43. Kilowatt hours consumed, 3,063,000, were 22% above the 2,464,000 kilowatt hours consumed in February and 44.4% above those recorded for March, 1943.

Harry L. Fisher, U. S. Industrial Chemicals, Inc., Stamford, Conn., on April 28 gave a lecture on "The Nature of Elastomers" in the special graduate course on "High Molecular Weight Organic Compounds" at Western Reserve University, Cleveland, O., and the next day discussed "Synthetic Rubbers" with the senior chemical students at Hiram College, Hiram, O.

Society for the Advancement of Management, Boston Chapter, at its meeting May 18 at the University Club, Boston, Mass., held its election of officers, including Kenneth C. Bevan, factory manager of Tyer Rubber Co., Andover, Mass., as vice president, and E. A. Currier, Jr., personnel director of the Cambridge Rubber Co., Cambridge, Mass., as a director.

Boston Group Chairman

Present chairman of the Boston Rubber Group is Joseph Lambert Haas, technical director of the Hodgman Rubber Co., Framingham, Mass. Born in Cologne, Germany, September 4, 1900, he came to this country at the age of one. He attended Harvard Engineering School, from which he was graduated (*cum laude*) in 1923 with a B.S. in industrial chemistry. Then for a year Mr. Haas worked for the Westinghouse Lamp Co. Next he went to the Electrical Alloy Co., where he remained until 1926, when he joined the Hodgman organization. Here he developed the process for plasticizing, compounding, and curing polyvinyl butyral so that it approxi-

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mates and in some cases even surpasses the performance of natural rubber when applied to fabric by conventional "rubberizing" methods.

Mr. Haas is a member of Committee D-11 on Coated Fabrics, American Society for Testing Materials; of the standards committee of the American Hospital Association; of the technical committee of the proofing division, Rubber Manufacturers Association, Inc., and also a member of several technical advisory committees serving various branches of the government. Besides he belongs to the Library Board of the Town of Framingham, the American Chemical Society, Society of the Plastics Industry, Knights of Columbus, and Framingham Country Club. He has, moreover, always been very active in the Boston Group and has served as chairman of its summer outing committees and last year as vice chairman of the Group. Mr. Haas finds relaxation in gardening, cards, and golf.

The Haas ménage, at 61 Barber Rd., Framingham is ruled over by four-year-old William.

Joseph L. Haas

CANADA

Canada exported 42,706 pairs of rubber boots and shoes, valued around £10,600 in January, compared with 34,355 pairs, value about £10,400, for January, 1943.

Joseph Stokes Rubber Co., Ltd., Welland, Ont., plans plant and equipment expansion costing about $250,000, according to Vice President L. R. Leaver, who reports it is intended to enlarge the plant for postwar manufacture of friction materials such as brake linings, brake blocks, clutch facings, and automotive replacement items as radiator hose, fan felts, etc. Mr. Leaver's announcement follows disclosure by Fred E. Schluter, president of the parent Thermoid Co., Trenton, N. J., that the Canadian subsidiary would be enlarged to permit wider participation in the international market, particularly in the British Empire.

Christopher Madsen, manager, Canadian Synthetic Rubber Co., Ltd., told a service club at Sarnia, Ont., in an address May 2 that the new synthetic rubber industry is not a "war baby" which will languish after the armistice. New processes are being and will be developed, and present plants will probably be reconverted, he said. Capacity may exceed demand, but the new synthetic rubbers will be so efficient and so economical, he maintained, that they will in all likelihood replace natural rubber permanently for most, if not all uses. The speaker further declared that such views are held by many of today's leading rubber technologists, and he added that their forecast is justified by the speed of the progress made during the past two years in developing improved methods of synthesis and adapting the various uses.

C. A. Leicht, assistant factory manager, B. F. Goodrich Rubber Co. of Canada, Ltd., Kitchener, Ont., was one of the main speakers recently before the Leather, Rubber & Tanners Safety Association, at the annual convention in Toronto, Ont., of the Industrial Accidents Prevention Associations.

Department of Munitions and Supply, Ottawa, Ont., in a report tabled in the Canadian House of Commons on May 18, at the request of J. W. Noseworthy, Co-operative Commonwealth Federation Member of Parliament for York South, states that the stock of scrap rubber held by the government-owned Fairmont Co. is considered sufficient for from 18 to 24 months. The company stopped purchasing scrap rubber February 15.

R. R. McLaughlin, professor of chemical engineering at the University of Toronto, Toronto, Ont., has disclosed that more than 1,600 chemists and chemical engineers throughout Canada have voted almost unanimously in favor of forming a single national organization. Dr. McLaughlin recently made his announcement on behalf of the Canadian Institute of Chemistry, the Canadian Chemical Association, and the Canadian Section of the Society of Chemical Industry, after members of the executive of these groups had conferred in Toronto. Dr. McLaughlin, chairman of the organization committee, says plebiscite forms were mailed to chemists and chemical engineers across the Dominion early in March asking opinion on the proposal to form a nation organization to be known as the Chemical Institute of Canada. More than 95% were in favor, he said, and it is expected the new organization will be provisionally established at the annual Canadian Chemical Conference in Toronto, June 5-7.

James A. MacKinnon, Canadian Minister of Trade and Commerce, was a guest of the Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., on May 16. President W. H. Funston, Jr., showed Mr. MacKinnon through the plant, explaining various processes in connection with tire building.

George L. Stewart, recently elected vice president of Imperial Oil, Ltd., to succeed L. C. McCloskey, retired, has been named president of the St. Clair Processing Corp., a subsidiary of Polymer Corp., Sarnia, Ont. There were no other changes in the directorate of the corporation, of which F. P. Dawson is vice president; F. C. Lantz, managing director; and A. P. Mechin, secretary-treasurer.

Dominion Rubber Co., Ltd., Montreal, P. Q., through President Paul C. Jones, has announced appointment of M. O. Simpson, comptroller and treasurer, to the position of vice president and treasurer. A. W. Bruce, assistant comptroller, becomes comptroller.

G. W. Charles, vice president and general manager, footwear division, has announced the appointment of C. B. Parsons as sales manager, footwear, at the company's main office. Mr. Parsons has had wide experience in the footwear field and previous to his present appointment was successively: manager, Columbus Rubber Co., Montreal; sales manager, Dominion Rubber, western division, Winnipeg; manager, footwear sales, eastern division, Montreal. Prior to his connection with the company's sales division Mr. Parsons was division auditor. J. J. Gilfillan, operating manager, eastern division, succeeds Mr. Parsons as the division's footwear sales manager. F. W. Parsons has been made sales manager, footwear, central division, Toronto, succeeding E. W. Bridgett, who has been appointed to special assignments. Mr. Parsons formerly was assistant to Vice President Charles in Montreal and previously had been operating manager at Edmonton and later had been appointed general credit manager, Montreal.

John Symonds, manager of transportation maintenance, Dominion Rubber, in a recent speech before a service club at Galt, Ont., stated that synthetic rubber should be in use very shortly in Canada for retreading in place of reclaimed material. He also said that with proper care it should be possible to get 25,000 miles out of synthetic automobile tires, and that there will be improvements right along in the manufacture and life of these tires.

Foreign Trade Opportunities

The following companies in Brazil wish to export to the United States:

Carnauba Wax, Beeswax, Rubber, Resins, Palm Kernel Oil, Cashew Nuts, Milkweed. Abreu & Cia, Ltda., Praça Conde dos Arcos, 4, Salvador, Baía.

Cotton, Carnauba Wax, Rubber. Paulo Carneiro da Cunha, Rua S. Mendes, 161, Terezina, Piauí.

Brazilian Raw Materials in General, Chemical By-Products and Derivatives. Sociedade Serra Ltda., Rua da Quitanda, 82, São Paulo.

Shoes and Galoshes. Cia. de Intercambio Pan-Americano "Cipan," Avenida Presidente Wilson, 113-A, Rio de Janeiro, represented in the U. S. by a partner of the concern, Mr. Miguel Etchenique, 120 Broadway, New York, N. Y.

The following firms wish to import from the United States:

Machinery, Electric Motors, Auto Accessories, Chemicals for Industry. Paulo Carneiro da Cunha.

Rebuilt Machinery, Electric Motors, Machine Tools. H. Lopes Coelho, Avenida Graça Aranha, 226, Rio de Janeiro.

Textiles, Textile Industry Equipment, Machines and Accessory Parts, Chemicals, Hospital Supplies. Luiz de Figueiredo, Caixa Postal 2257, Rio de Janeiro.

The concerns below are interested in representing American companies in Brazil:

Machado & Gonçalves, Ltda., Largo Santa Rita, 8, Rio de Janeiro. (Correspondence in French or in Portuguese.)

Soc. Continental de Importação e Comércio, Ltda., Rua do Rosário, 77, Rio de Janeiro.

Intercontinental Importadora e Exportadora Ltda., Rua 3 de Dezembro, 48, São Paulo.

Representações, Exportação, Importação Aurea Ltda., Avenida Rio Branco, 120, Rio de Janeiro.

Cia. Exportadora e Importadora Nacional S. A., Avenida Nilo Peçanha, 12-10° Andar, Rio de Janeiro.

Red Lead, Zinc and Lead Carbonate, Machinery for Mechanical Workshops and for the Textile Industry. Recomag Representações Ltda., Rua Buenos Aires, 41, Rio de Janeiro.

OBITUARY

John C. Brooks

JOHN C. BROOKS, vice president and director of Monsanto Chemical Co., St. Louis 4, Mo., and general manager of its plastics division at Springfield, Mass., died April 26 on a train en route from St. Louis to New York. He was also president and a director of Shawinigan Resins Corp., a Monsanto affiliate.

The deceased was born April 7, 1886, in Westfield, Mass. He attended Massachusetts Institute of Technology and was graduated in 1908 and then worked successively for Jones & Laughlin Steel Corp., Indianapolis Water Works, International Silver Co., and Goodall & Pratt Co. He entered the plastics industry in 1922 as general manager of the Fiberloid Corp., later becoming its president. When Fiberloid became the nucleus of Monsanto's plastics division, Mr. Brooks was appointed a vice president of the Monsanto company and also general manager of the plastics division.

Mr. Brooks was affiliated with various fraternal and civic organizations, including the corporation of the Springfield and Wesson Memorial Hospitals and the Springfield Chamber of Commerce and Country Club. He was also a Mason.

He is survived by his wife, two daughters, a sister and a brother.

Funeral services were held in Springfield on April 29, with interment in Longmeadow, Mass.

Joseph S. Bennitt

JOSEPH S. BENNITT, chairman of the war contract division, Seamless Rubber Co., New Haven, Conn., died May 16 in New Haven hospital following a heart attack. Born January 28, 1885, in Dorchester, Mass., he attended Stevens Institute of Technology and the Colorado School of Mines. After graduation he served as engineer on the first power transmission line across the Rocky Mountains. In 1915, Mr. Bennitt became affiliated with his brother in a retail sporting goods business in New Haven. Later he served the Winchester Repeating Arms Co., in various capacities, and the Schick Razor Co., as eastern sales manager. On May 1, 1930 he joined the Seamless Rubber Co. to establish and manage its sporting goods division.

Funeral services were held May 19 at the Hawley Lincoln Memorial, New Haven. Burial was in Center Cemetery, New Milford, Conn.

He is survived by a wife, a son, and two brothers.

Ralph W. Hutchens

AFTER a long illness Ralph Wilgus Hutchens died in an Eau Claire, Wis., hospital on April 23. He was president of Hutchens Industries and a former president of Gillette Rubber Co., both of Eau Claire.

The deceased, who was born in Indianapolis, Ind., September 3, 1891, attended local public schools and Hornell Business College and in 1906 joined the engineering department of the G. & J. Tire Co., Indianapolis. Then on April 15, 1917, Mr. Hutchens went to the Gillette firm and became secretary and factory manager in 1920 and two years later vice president and general manager. On July 1, 1940, owing to poor health, he

Ralph W. Hutchens

resigned the presidency to which he had been named in the early Thirties, but remained with the organization on a consulting basis until October 31, 1941. When his health improved, he organized the filter manufacturing company, Hutchens Industries, which, incidentally, will continue its operations despite the death of its founder. Mr. Hutchens was also financially interested in several other businesses and was a director of the Union National Bank and Vecke Dairy Co.

Besides Mr. Hutchens had taken out many patents on automatic machinery for rubber manufacturing, tire designs, etc. During his lifetime he had belonged to the American Society of Mechanical Engineers, Masons, Shriners, Elks, Westinghouse, Church & Kerr Alumni Association, Eau Claire Chamber of Commerce, Kiwanis Club, and Eau Claire Bit & Spur Club, in many of which he had held office. He was, moreover, very active in the affairs of the Eau Claire Episcopal diocese.

Funeral services were conducted at the Christ Church Cathedral on April 26, and burial was in Lake View Cemetery, with Masonic rites at the grave.

Survivors are his wife, his father, two daughters, a son, two brothers, and a sister. His father, Edward Hutchens, is president of Utility Mfg. Co., Cudahy; while one brother, Howard O. Hutchens, is factory manager of the Gillette plant of United States Rubber Co.

James G. Grower

JAMES GORDON GROWER, vice president and sales manager of Haartz-Mason-Grower Co., Watertown, Mass., died suddenly of a heart attack on a train near Warsaw, Ind., April 13. He was born July 4, 1889, in New York, N. Y. He attended Brooklyn Commercial High School, Brooklyn Polytechnic Institute, and Columbia University. During the first World War he served overseas. After the war Mr. Grower was employed in the production of rubberized fabric by the Kenyon Co., and in 1927 became associated with the Haartz-Mason-Grower Co.

Mr. Grower was chairman of the coated materials division of the Rubber Manufacturers Association, Inc., and a member of the Rotary Club and the Masonic and Shrine orders.

Funeral services were held in Phillips Congregational Church, Watertown, and burial was in Woodlawn Cemetery, Wellesly, Mass., April 17.

The widow and two daughters survive.

FINANCIAL

American Cyanamid Co., New York, N. Y., and subsidiaries. First quarter, 1944: net income, $1,121,384, equal, after preferred dividends, to 35¢ each on 2,666,026 common shares, compared with $1,440,925, or 48¢ a share, in the same quarter last year.

American Zinc, Lead & Smelting Co., Columbus, O. First quarter, 1944: net profit, $148,124, or 9¢ a common share, against $197,073, or 16¢ a share, in the March quarter of 1943; net sales, $6,941,738, against $5,960,086.

Baldwin Locomotive Works, Philadelphia, Pa., and wholly owned subsidiaries. Year ended March 31, 1944: net profit $5,052,020, equal, after preferred dividends, to $3.83 each on 1,275,694 common shares, contrasted with $5,352,452, or $5.04 each on 1,028,512 common shares, in the previous 12 months; taxes, $25,850,000, against $18,148,510; sales, $233,846,738, against $187,460,986.

Belden Mfg. Co., Chicago, Ill. First quarter, 1944: net profit, $91,206, or 38¢ a share, against $139,944 (revised), or 58¢ a share, in the 1943 period.

Columbian Carbon Co., New York, N. Y. First quarter, 1944: consolidated net earnings, $859,654, equal to $1.60 a share, contrasted with $842,399, or $1.57 a share, in the first three months last year.

Crown Cork & Seal Co., Baltimore, Md. First quarter, 1944: net profit, $455,260, equal to 64¢ a common share, against $334,425, or 40¢ a share, in the corresponding period last year; net sales, $14,197,228, against $11,214,550.

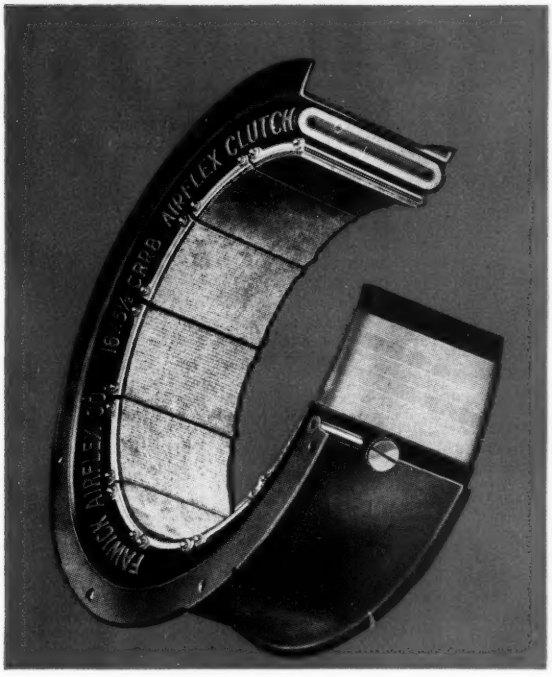
E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., and wholly owned subsidiaries. March quarter: net income, $17,242,862, equal to $1.38 each on 11,109,712 common shares, against $14,739,314, or $1.16 each on 11,110,090 common shares in the 1943 period; net sales, $150,921,722, against $133,622,229.

Garlock Packing Co., Palmyra, N. Y. For 1943: net income, $999,359, or $4.77 a common share, against $1,106,355, or $5.28 a share, in 1942.

General Cable Corp., New York, N. Y. For 1943: net profit, $2,078,116, or $13.83 a share on the 7% cumulative preferred stock (in which dividends unpaid totaled $52.50 a share, or $7,875,000) and $3.35 each (which should have been $4) on Class A stock, compared with $2,786,171, or $18.57 a preferred share, $5.66 a Class A share, and 76¢ a common share, in 1942.

I. B. Kleinert Rubber Co., New York, N. Y., and subsidiaries. For 1943: net profit, subject to renegotiation, $333,091, equal to $2.04 a common share, against $315,817, equal to $1.94 a share, in 1942.

Minnesota Mining & Mfg. Co., St Paul, Minn. For 1943: consolidated net income, $4,022,520, equal to $4.18 a share, against $3,476,870, or $3.62 a share, in 1942; sales, $47,200,400, compared with $34,209,258.



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Hercules Powder Co., Wilmington, Del. March quarter: net earnings, $1,137,958, equal, after preferred dividend requirements, to 70¢ each on 1,316,710 common shares, compared with $1,378,410, or 95¢ a share, for the same period of 1943; taxes, $2,962,832, against $5,062,968; reserve for contingencies, $100,000, against $400,000, net sales, $20,560,896, against $30,367,239.

Lee Rubber & Tire Corp., Conshohocken, Pa. Six months to April 30: net profit, $644,863, or $2.67 a share, against $602,585, or $2.50 a share, in the corresponding period a year ago; net sales, $13,295,035, against $11,528,927.

Mohawk Rubber Co., Akron, O. For 1943: net profit, subject to renegotiation, $354,434, equal to $2.50 a share of outstanding stock, compared with $348,948, or $2.46 a share, in 1942; net sales, $5,290,996, against $3,085,505; current assets, December 31, 1943, $1,645,360; current liabilities $195,193; federal income taxes, $689,820, up about one-half million dollars.

Monsanto Chemical Co., St. Louis, Mo., and American subsidiaries. March quarter: consolidated net income, $1,141,733, equal to 73¢ a common share, against $1,348,711, or 92¢ a share, in the first three months of 1940; net sales, excluding those of the five government owned plants operated by the company, $20,063,490, against $19,967,245.

National Automotive Fibers, Inc., Detroit, Mich., and wholly owned subsidiary. For 1943: net profit, $897,606, or $1.52 a common share, against $522,089, or 78¢ a share, in 1942; income tax, $2,451,531, against $1,054,261; sales, $22,971,436, against $18,646,408.

New Jersey Zinc Co., New York, N. Y. March quarter: consolidated net profit, $1,354,929, or 69¢ a share, against $1,736,491, or 86¢ a share, in the like period last year.

Phillips Petroleum Co., Bartlesville, Okla. First three months, 1944: net profit, $3,713,011, equivalent to 76¢ each on 4,916,987 shares, against $3,597,334, or 80¢ each on 4,492,980 shares, in the like period last year; taxes, $3,115,000, against $2,750,000.

Phelps Dodge Corp., New York, N. Y., and subsidiaries. For 1943: consolidated net income, $14,079,560, equal to $2.78 a share, against $14,051,569, or $2.77 a share, in 1942; reserve for contingencies, $500,000, against $1,500,000; provision for excess profits and income taxes and renegotiation of war contracts, $17,800,000, against $18,000,000.

Raybestos-Manhattan, Inc., Passaic, N. J., and domestic subsidiaries. For 1943: net profit, $1,651,160, or $2.63 a share, compared with $1,622,084, or $2.58 a share, in 1942; net sales, $57,135,090, against $47,866,688; federal income taxes, $984,000, against $933,000; excess profits taxes, $6,111,000, against $5,742,000; contingencies, $1,000,000, against $650,000; current assets, December 31, 1943, $19,809,505.14, current liabilities, $7,224,035.73. First quarter, 1944: net profit, $491,329, or 78¢ a share, against $468,532, or 75¢ a share, in the like period last year; taxes, $2,066,800, against $1,877,750.

Shell Union Oil Corp., New York, N. Y. For 1943: consolidated net income, $24,542,556, or $1.82 each on 13,470,625 common shares outstanding, against $16,860,000, or $1.29 a share, in 1942; provision for federal income and excess profits tax, $31,500,000, against $23,800,000.

Skelly Oil Co., Kansas City, Mo. For 1943: net profit, $5,461,708, equal to $5.56 a common share, compared with $5,632,805, or $5.73 a share, the year before; taxes, $5,342,000, against $3,566,458; current assets, December 31, 1943, $24,173,270, current liabilities, $12,401,225. First quarter, 1944: consolidated net income $1,754,359, equal to $1.78 each on 981,348 common shares, against $1,231,925, or $1.25 a share, in the 1943 quarter; provision for taxes, $1,963,000, against $898,300.

Timken Roller Bearing Co., Canton 6, O. First three months, 1944: net income $1,348,049, or 56¢ a share, against $1,579,513, or 65¢ a share, in the corresponding period of 1943.

Tyer Rubber Co., Andover, Mass. Year ended February 29, 1944: net income, $98,625, equal to $3.08 a common share, against $111,562, or $3.57 a share, in the preceding 12 months; taxes, $387,887, against $417,879.

Thermoid Co., Trenton, N. J., and subsidiaries. For 1943: consolidated net income, $526,334, equal to 72¢ each on 600,000 common shares outstanding, against $434,445, or 70¢ each on 475,000 common shares, in 1942; combined sales, $21,685,676, a record figure, contrasted with $12,049,841.

S. S. White Dental Mfg. Co., Philadelphia, Pa., and subsidiaries. For 1943: net income, $644,326, or $2.15 a share, against $570,824, or $1.91 a share, for 1942; net sales, $16,779,697, compared with $13,350,053.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Armstrong Rubber Co.	"A"	$0.50 irreg.	June 10	May 15
Armstrong Rubber Co.	"B"	0.50 irreg.	June 10	May 15
Canada Wire & Cable Co., Ltd.	"A"	1.00	June 15	May 31
Canada Wire & Cable Co., Ltd.	"B"	0.25	June 15	May 31
Collins & Aikman Corp.	5% Pfd.	1.25 q.	June 1	May 19
Collins & Aikman Corp.	Com.	0.25	June 1	May 19
Crown Cork & Seal Co.	$2.25 Pfd.	0.5625 q.	June 15	May 31
E. I. du Pont de Nemours & Co., Inc.	Com.	1.25 interim	June 14	May 22
E. I. du Pont de Nemours & Co., Inc.	Pfd.	1.125 q.	July 25	July 10
Dunlop Rubber, Ltd.	"A"	8% final	July 8	May 26
Faultless Rubber Co.	Com.	0.50 irreg.	June 26	June 15
Flintkote Co.	Pfd.	1.125 q.	June 15	June 9
Flintkote Co.	Com.	0.15	June 15	June 9
B. F. Goodrich Co.	Com.	0.50	June 15	June 1
B. F. Goodrich Co.	Pfd.	1.25 q.	June 30	June 21
Goodyear Tire & Rubber Co., Inc.	Pfd.	1.25 q.	June 15	May 15
Goodyear Tire & Rubber Co., Inc.	Com.	0.50	June 15	May 15
Hewitt Rubber Corp.	Com.	0.25 q.	June 15	May 31
Midwest Rubber Reclaiming Co.	Pfd.	1.00 q.	June 1	May 20
Okonite Co.	Com.	0.50 extra	May 1	Apr. 14
Okonite Co.	Com.	1.50 q.	May 1	Apr. 14
Okonite Co.	Pfd.	1.50 q.	June 1	May 15
Raybestos-Manhattan, Inc.	Com.	0.375	June 12	May 26
Seiberling Rubber Co.	5% A Pfd.	1.25 q.	July 1	June 15
Seiberling Rubber Co.	$2.50 Cp. Pfd.	0.62 q.	July 1	June 15
Tyer Rubber Co.	Com.	0.50	May 15	May 8
Tyer Rubber Co.	6% Pfd.	1.50 q.	May 15	May 8
United Elastic Corp.	Com.	0.35	June 30	May 19
United States Rubber Co.	Com.	0.50	June 9	May 26

Plasticizer for Synthetics

PARAPLEX G-25, a saturated resinous polyester, is reported to have a high compatibility as a plasticizer for Buna-N-type synthetic rubbers, polyvinyl chloride, and vinyl copolymer resins. It is a stable brown viscous liquid, permanently soft and thermoplastic, with a specific gravity of 1.06. This recently developed agent combines desirable features of ester-type plasticizers with the resistance and permanence characteristic of a synthetic resin plasticizer. Compounds containing it are said to retain their original physical properties through a wide temperature range in service. Compounds in which Paraplex G-25 is the principal plasticizer have the following properties: low volatility and flammability, good plasticity, heat stability, low temperature flexibility, electrical and processing properties, and water resistance, and some resistance to oils and gasoline.

Paraplex G-25 stocks can be compounded on rubber mill rolls. A preliminary milling in a Banbury or other heavy-duty mixer, prior to milling on the rubber rolls, is recommended. The plasticizer is readily soluble in esters, ketones, and aromatic and chlorinated hydrocarbons. It has a limited compatibility with GR-S, Neoprene GN, and "Thiokol", and is incompatible with ethyl cellulose and polyvinyl butyral. Resinous Products & Chemical Co., Washington Sq., Philadelphia 5, Pa.

Wear of Tire Treads

AN ARTICLE by Frank L. Roth and W. L. Holt, of the National Bureau of Standards, in the February *Journal of Research* reports on the method used by the Bureau during the emergency period for rapidly determining the rates of wear of several tread materials by weighing the tire at intervals during the wear test and noting the loss of weight. This method involved a minimum amount of work and required relatively few miles of driving to obtain a reasonably reliable rate of wear which could be extrapolated to predict the life of the tread. The results obtained showed the method to be feasible for passenger car tires, and, in addition to yielding data on the value of different materials for treads, it indicated the effect of other details, such as the location of the tires on the car and the alinement of the wheels.

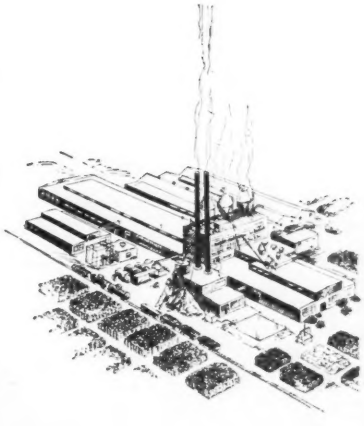
Data on five different tread materials, including prewar natural rubber treads, were given, and the rate of wear of the least resistant tread material was eight times that of the most resistant material. GR-S type synthetic appears from these tests to be nearly as good as natural rubber.

Midwest Announces...

A NEW RESEARCH LABORATORY

Now... Two plants devoted to Maximum Production for War Requirements

Plus... Research facilities for development of Present and Post-War Reclaiming of Natural and Synthetic Rubbers.



MIDWEST RUBBER RECLAIMING CO.

East St. Louis, Ill.
East 7400

★ ★ ★

Barberton, Ohio
Sherwood 3131

Patents and Trade Marks

APPLICATION

United States

2,345,550. **Improved Type of Aerial Fence in Which a Main Inflatable and Deflatable Balloon,** at the Upper End of a Cable, Contains a Number of Smaller Balloons within it. A. Berman, Louisville, Ky.

2,345,588. **In an Oil Seal for a Space between a Housing and a Rotatable Shaft, a Metal Casing,** an Angle Shaped Molded Packing Ring of Oil-Resistant Rubber-like Material, and a Molded Pressure Ring of Flexible Oil Resistant Soft Resilient Synthetic Rubber Compound. H. M. Dodge, Wabash, Ind., assignor to General Tire & Rubber Co., Akron, O.

2,345,643. **Multiple Glass Sash Provided with a Breather, a Metal Rail,** and a Rubber Glazing Strip Mounted in the Rail. C. M. Verhagen, Elkhart, Ind., assignor to the Adlake Co., Chicago, Ill.

2,345,649. **Breast Support of Porous or Cellular Latex Rubber.** C. E. Zimmerman and J. F. Skold, both of Chicago, Ill.; Skold assignor to Zimmerman.

2,345,666. **Stocking Top Incorporating Rubber Yarn.** I. H. C. Green, Central Falls, and E. St. Pierre, Pawtucket, assignors to Hemphill Co., Central Falls, both in R. I.

2,345,743. **For a Refrigerator Door, a Gasket Assembly Including a Resilient Member of Like Compressible Material.** D. H. Gaston, assignor to Sunbeam Electric Mfg. Co., both of Evansville, Ind.

2,345,763. **For Self-laying Track Vehicles, a Track Including a Flexible Body of Rubber-Like Material.** R. Mayne, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,345,819. **In an Attachment for a Milking Apparatus, Nipples Adapted to Have Tubes Leading from Teat Cups to a Milking Machine.** T. H. Kirk, Lake Worth, and W. B. Kirk, Lantana, both in Fla.

2,345,921. **In a Thermohydrometer for Testing Various Liquid Solutions with Different Specific Gravity Characteristics, a Liquid and Float Receiving Barrel and a Suction Bulb at the Upper End.** L. Edelmann, Chicago, Ill.

2,345,977. **For Molding Hollow Bodies, a Distendable Bag for a Destructible and Removable Shaped Mandrel.** A. M. Howald and L. S. Meyer, both of Toledo, O., assignors by mesne assignments to Libbey-Owens-Ford Glass Co., a corporation of O.

2,346,019. **Air-Jacket of Two Separable Thin Layers of Rubber That Can Be Partially Inflated When Used as an Article of Clothing, or Fully Inflated When Used as a Life Preserver.** V. Gerich, New York, N. Y.

2,346,226. **Watertight Cover for Apertures for Loud-Speaking Instruments, Microphones, Etc.** D. H. Marlow, assignors to British Rola, Ltd., both of London, England.

2,346,495. **In an Electrical Measuring Instrument Having a Casing with a Window, a Rubber Self-Sealing Insert between the Edge of the Window and the Interior Surface of the Casing.** F. J. Lingel, assignor to R. L. Triplett, both of Bluffton, O.

2,346,574. **A Resilient Bushing Having a Sleeve, a Stud within and Extending through the Sleeve, and a Rubber Member Surrounding the Stud.** F. M. Guy, assignor to Guy & Murton, Inc., both of Detroit, Mich.

2,346,580. **Rubber Bellows for a Duplex Sound Producer.** B. L. Henry, New York, N. Y.

2,346,633. **Apparatus for Landing an Airplane, Which Includes a Railway Car with a Flat Platform and Magnets Projecting through It and Layers of Vulcanized Rubber on the Upper Surfaces of the Magnets.** D. H. Bottrill, assignor to Canadian Car & Foundry Co., Ltd., both of Montreal, P. Q., Canada.

2,346,640. **Making Leakproof Dry Cells with the aid of Thermoplastic Molding Material Extruded around the Sides and Top of the Cells.** H. R. C. Anthony, Madison, Wis., assignor to Ray-O-Vac Co., a corporation of Wis.

2,346,651. **Shoes with an Elastic Area in the Upper.** S. Bown, St. Louis County, Mo., assignor to International Shoe Co., St. Louis, Mo.

2,346,695. **Electric Water-Light Including Shock Absorbing Means of Expanded Cellular Rubber.** G. Miller, New Haven, Conn.

2,346,774. **Means for Forming Images, Consisting of a Pair of Hinged Sheets of Plastic Material, Each Carrying a Relief. Adapted to Absorb Aqueous Solutions of Dichloric Dyes and to Transfer the Solutions to a Sheet of Molecularly Oriented Polyvinyl Alcohol When Brought into Contact therewith.** J. Mahler, Brookline, Mass., assignor to Polaroid Corp., Dover, Del.

2,346,799. **Resilient Tire Having Arcuate Springs Arranged Transversely in the Casing, and Means to Prevent Outward Yielding under any Tire Load of the Springs at the Opposite Portions thereof Where Maximum Outward Yielding Would Otherwise Occur.** W. A. Tripp, Winthrop, Mass.

2,347,005. **Knitted Fabric of Elastic and Non-Elastic Yarn.** W. L. Smith, Jr., Pawtucket, assignor to Hemphill Co., Central Falls, both in R. I.

2,347,021. **Container with Elastic Bands.** Z. Auerbach, New York, N. Y.

2,347,149. **Air Nozzle Consisting of a Conical Member of Non-Metallic, Rigid, Heat Insulating Material, to the Large End of Which Is Attached a Substantially Cylindrical Sheet Metal Member, and a Binder Layer of Thermoplastic Material on the Inner and Outer Surfaces of the Conical Member.** F. H. Chirgwin, Los Angeles, Calif., assignor to B. F. Sturtevant Co., Boston, Mass.

2,347,154. **Foundation Garment with Elastic Panels.** M. Kahn, Cedarhurst, assignor to Artistic Foundations, Inc., New York, both in N. Y.

2,347,158. **Beading Strip Consisting of a Bead of Flexible Fibrous Material to Which Is Secured a Flexible, Resilient Attaching Strip, Both Bead and Strip Being Impregnated with a Binder; and over the Impregnated Bead and Strip, an Outwardly Non-Adhesive Coating Deposited from a Latex Dispersion.** L. Spraragen, assignor to Bridgeport Fabrics, Inc., both of Bridgeport, Conn.

2,347,159. **Beading Strip Consisting of a Bead of Flexible Material, to Which Is Anchored a Laminated Attaching Strip Made of Strips of Paper with Wire Loops, between: Both Bead and Attaching Strip Are Impregnated with a Binder, and over the Bead and the Strip an Outwardly Non-Adhesive Coating Deposited from a Latex Dispersion.** L. Spraragen, assignor to Bridgeport Fabrics, Inc., both of Bridgeport, Conn.

2,347,163. **Balloon for Carrying and Automatically Dropping Incendiary Material.** H. T. Kraft, Akron, and W. C. McCoy, Shaker Heights, assignors to General Tire & Rubber Co., Akron, both in O.

2,347,191. **Galosh Having Rubber Supporting Structure and Wall Panels of Rubber-Like Water-Impervious Resin of Vinylite-V, in Sheet Form.** A. J. McGillicuddy, assignor of one half to G. A. Kjosness, both of Spokane, Wash., and one-half to B. H. Levenson, Washington, D. C.

2,347,197. **Inflatable Bag Adapted for Use as Tourniquet.** E. J. LaLiberte, Springfield, Mass.

2,347,355. **Facial Cleaner Consisting of a Cup of Rubber-Like Material and a Mass of Spongy Material.** G. L. Lindblad, Joliet, Ill.

2,347,500. **Spaced Flat Rubber Blocks between the Tie Rod Means and the Bolster Member or Spring Plank Member of the Frame of a Railway Car Truck.** P. Parke, assignor to Pullman Co., both of Chicago, Ill.

2,347,530. **Welt Insole with Sewing Rib of Synthetic Plastic Material Like Koroseal, Vinylite, Etc.** W. C. Wright, Brookfield, N. H.

2,347,567. **For Surgical Implants in Dentistry, a Thermoplastic of the Methyl Methacrylate Type, in Which Is Incorporated a Solid Water Soluble Chemical with Germicidal Properties, Capable of Producing a Porous Structure after the Germicide Has Been Dissolved and removed by Osmotic Action.** E. I. Kresse, Denver, Colo.

2,347,583. **Improved Life Preserver.** K. Vartabedian, Chicago, Ill.

Dominion of Canada

419,243. **Woven Elastic Stocking.** R. and J. Pickles, both of Burnley, Lancaster, England.

419,307. **Shoe Stiffener Consisting of Felt-Like Sheet Material of Fibers of a Copolymer of Vinyl Chloride and Vinyl Acetate, Soluble in a Volatile Organic Solvent, and Cotton Fibers.** Celastic Corp., Arlington, assignee of L. R. Bailey, Hohokus, and O. L. Quinlivan, East Orange, all in N. J., U. S. A.

419,309. **Collapsible Rubber Decoy.** Dewey & Almy Chemical Corp., Cambridge, assignee of M. R. Day, North Scituate, both in Mass., U. S. A.

419,320. **Tire Including a Cover of Vulcanized Rubber Consisting of Integrally United Portions of Hard and Soft Rubber, the Softer Rubber Predominating in the Sidewalls, and the Hard Rubber in the Tread Portion.** Henley's Tire & Rubber Co., Ltd., assignee of H. T. Stanley, both of Dorking, Surrey, England.

419,341. **Undergarment with Stretchable Sections.** A. Stein & Co., Chicago, assignee of C. Bullinger, Riverside, both in Ill., U. S. A.

419,358. **Belt Fastener with Rubber Bushing.** Wingfoot Corp., Wilmington, Del., assignee of C. F. Smith, Cuyahoga Falls, O., both in the U. S. A.

419,535. **Protective Coating for Rubber Surfaces Made of Dead-Milled Rubber and a Substantial Proportion of a Reaction of Rubber and Halogen Acid of Tin.** Canadian General Electric Co., Ltd., Toronto, assignee of G. F. Rishor, Peterborough, both in Ont.

419,546. **Flash Lamp Including a Bulb With Inner Surface Coated with a Transparent Film of Low Viscosity Polyvinyl Acetate.** Carbide & Chemicals, Ltd., Toronto, Ont., assignee of C. W. Paxton, Palisades Park, N. J., U. S. A.

419,550. **Absorbent Form Lining.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of A. W. Meyer, Nutley, N. J., U. S. A.

419,592. **Multiple-Pole Electric Coupling Including a Socket and Plug of Resilient Rubber-Like Material.** Pye, Ltd., assignee of J. W. Dalgleish, both of Cambridge, England.

419,608. **Rubber Bushing for a Joint.** Thompson Products, Inc., Cleveland, O., assignee of J. L. Edington, Detroit, Mich., both in the U. S. A.

419,619. **In an Electric Cable, Textile Threads Coated with a Thermoplastic Material.** Western Electric Co., Inc., New York, N. Y., assignee of G. R. Brown, Newark, N. J., both in the U. S. A.

419,622. **In a Telephone Calling Dial, in Combination, a Rotatable Finger Wheel of Acrylate Resin.** Western Electric Co., Inc., assignee of Bell Telephone Laboratories, Inc., both of New York, assignee of H. W. Goff, Manhassett, both in N. Y., U. S. A.

419,626. **In Combination with a Package in a Rubber Hydrochloride Film, a Tear Tape Consisting of Strips of Rubber Hydrochloride Film.** Wingfoot Corp., Akron, O., U. S. A., assignee of M. S. Meyer, Wellington, New Zealand.

419,628. **Enlarged Model Red Blood Cell of Rubber Composition.** John Wyeth & Bro. (Canada), Ltd., Windsor, Ont., assignee of A. Barol, Philadelphia, Pa., U. S. A.

419,655. **Pneumatic Form for Use in Constructing Shell-Form Structures.** W. Neff, Los Angeles, Calif.

419,671. **Coated Abrasive with Backing of Laminated Fabric United by a Synthetic Resin.** Behr-Manning Corp., assignee of N. E. Oglesby, both of Troy, N. Y., U. S. A.

419,710. **For Bending Thin Metal Tubes, a Non-Metallic Flexible and Resilient Mandrel.** Morris Motors, Ltd., Cowley, Oxford, assignee of G. E. Dono and R. H. Goddard, both of Oxford, both in England.

419,750. **In a Crystal Reproducing Member, a Tone Arm of Molded Insulating Material.** Webster Electric Co., assignee of R. Dally, both of Racine, Wis.

419,752. **Polyvinyl Alcohol Resin Resist for Producing Ornamental Material.** C. Dreyfus, New York, N. Y., assignee of A. Lyem, Cumberland, Md., both in the U. S. A.

United Kingdom

559,746. **Collapsible Boats.** F. B. S. Grimston.

PROCESS

United States

2,345,629. **Embossing the Surface of a Normally Crystalline Polymer of the Group of Polymeric Vinylidene Chloride and Normally Crystalline Copolymers of Vinylidene Choride.** J. H. Reilly, assignor to Dow Chemical Co., both of Midland, Mich.

2,345,844. **Coating Slitted and Expanded Sheet of Fibrous and Cellulose Base Materials with an Aqueous Dispersion of Rubber.** H. F. Weiss, deceased, by N. E. Weiss, executrix, assignor by mesne assignments to Research Products Corp., all of Madison, Wis.

2,345,864. **Conductor Core for Wire Ropes Subjected to Extreme Conditions of Pressure and Temperature, in Which Rubber and Rubber-Like Synthetic Material Are Used.** J. C. Arnold, assignor to Lane-Wells Co., both of Los Angeles, Calif.

2,346,201. **Producing a Porous-Surfaced Artificial Sponge by Carding and Singeing the Crust Surfaces of a Molded Coagulated Sponge-Forming Composition.** L. P. G. Vautier, Saint Just des Marais, France; vested in the Alien Property Custodian.

2,346,523. **Impregnating Cables in Continuous Lengths.** R. S. Vincent, assignor to Callenders Cable & Construction Co., Ltd., both of London, England.

2,346,634. **Hollow Rubber Articles.** D. C. Kempthorn, Akron, assignor to Sun Rubber Co., Barberton, both in Ohio.

2,347,036. **Filaments from a Molten Thermoplastic Material.** E. Dumont, Troisdorf, Germany; vested in the Alien Property Custodian.

2,347,233. **Laying a Composite Surfacing Material Consisting of a Plastic Bituminous Material, Finely Divided Rubber Particles, and as a Binder, an Alkyd Resin.** C. G. Abernathy, assignor of one-half to A. L. Blades, both of Hornell, N. Y.

2,347,464. **Grinding Resinous and Thermoplastic Materials to Produce a Finely Pulverized**

The C. P. Hall Co.
CHEMICAL MANUFACTURERS

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SYN-TAC

A FREE FLOWING PLASTICIZER FOR STYRENE TYPE SYNTHETIC RUBBER

IMPROVES TACK

IMPROVES DISPERSION

IMPROVES TEAR

IMPROVES ELONGATION

AKRON, OHIO • LOS ANGELES, CALIF. • CHICAGO, ILL.

Product. C. W. Cuno, Wilmington, Ill., assignor to Lehon Co., Chicago, Ill.

Dominion of Canada

419,365. **Improving the Wear Resistance of Textile Materials by Impregnating Them with an Aqueous Dispersion of a Synthetic Soft Rubber-Like Material, Which Process Includes the Separate Step of Scouring the Material with a Hot Alkaline Solution to Remove Greasy Matter.** H. Corteen and Tootal Broadhurst Lee Co., Ltd., assignee of A. E. Battye, co-inventor with H. Corteen, all of Manchester, England.

419,406. **Forming a Unitary Filament from a Bundle of Thermoplastic Vinyl Resin Filaments.** American Viscose Corp., assignee of K. Heymann, both of Wilmington, Del., U. S. A.

419,581. **Insulated Power Cable in Which Both Conducting and Insulating Rubber Are Used.** Northern Electric Co., Ltd., Montreal, P. Q., assignee of T. R. Scott, J. K. Webb, and J. F. Morley, all of London, England.

United Kingdom

559,657. **Welding Thermoplastic Bodies.** L. H. P. and A. H. Jarrard (legal representatives of W. J. Jarrard).

559,683. **Reenforcement of Plastic Materials.** P. W. Rosenfeld and Gibson, Ltd.

CHEMICAL

United States

2,343,866. **Manufacture of Acetylene by the Pyrolysis of Hydrocarbons.** W. B. Hincke, Kingsport, Tenn., assignor by mesne assignments to Wulff Process Co., Los Angeles, Calif.

2,343,898. **Water-Resistant, Film-Forming Reaction Product of an Antimony Compound with a Polyvinyl Alcohol and an Amylaceous Substance.** I. L. Griffin, A. E. Truax, and N. H. Nuttall, all of Charlotte, N. C., assignors to Stein, Hall & Co., Inc., New York, N. Y.

2,343,925. **Coating Composition Consisting of a Resin, Metallic Flake, and from 1% to 8% of 1,2-Hydroxystearin.** R. E. Pike, Yeadon, Pa., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,343,950. **Vinyl Ester Stabilized with an Anhydrous Ammonium Salt of an Organic Carboxylic Acid.** A. Berne-Allen, Jr., Waynesboro, Va., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,343,972. **Fusible Resin Which Is a Furfuryl Alcohol-Formaldehyde-Acid Condensation Product.** M. T. Harvey, South Orange, N. J., assignor to Harvel Research Corp., a corporation of N. J.

2,343,973. **Resin Obtained by Reacting under Acid Conditions wherein the pH Value Is not less than That Obtained in a Solution of Two Cc. of Concentrated Hydrochloric Acid in 60 Cc. of Distilled Water, Formaldehyde, and a Fusible Acid Condensation-Polymerization Product of Furfuryl Alcohol.** M. T. Harvey, South Orange, N. J., assignor to Harvel Research Corp., a corporation of N. J.

2,343,997. **Polymerized Vinyl Chloride Coating Composition Stabilized against Decomposition on Heating.** G. M. Powell and W. H. McKnight, both of Charleston, W. Va., assignors to Carbide & Carbon Chemicals Corp., a corporation of N. Y.

2,344,018. **Underwater Paint Including Coumarone Resin, Tetrahydronaphthalene, Chlorinated Rubber Dissolved in Benzol, a Repellent of the Class of Croton Oil and the Methanol-Soluble Extract thereof, Red Oxide of Iron and Charcoal Charged with Ammonia.** E. Naumheier, Oschatz-Zscholiau, Germany; vested in the Alien Property Custodian.

2,344,026. **Resins of the Coumarone-Indene Type.** E. L. Cline, Philadelphia, Pa., assignor to Allied Chemical & Dye Corp., New York, N. Y.

2,344,027. **Carbon Black.** L. M. Conner, Sunray, Tex., assignor to Continental Carbon Co., a corporation of Del.

2,344,061. **Preparing 1-Chloro-1-Fluoro-Ethylene.** M. W. Renoll, Dayton, O., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,344,085. **Plastic Composition by Polymerizing the Ethers of Hydroxy-1-Butadiene together with Maleic Anhydride.** P. Halbig, Freiburg, Switzerland, and F. Matthias and A. Treibs, both in Munich, Germany; vested in the Alien Property Custodian.

2,344,194. **Resin Consisting of a Hard Stable, Oil-Soluble Ester of a Polypentaerythritol, a Rosin Acid and an Alpha-Beta Unsaturated Polycarboxylic Acid.** G. R. Anderson, Elsmere, assignor to Hercules Powder Co., Wilmington, both in Del.

2,344,213. **Polymerization Products from Isobutylene.** M. Otto, Ludwigshafen-on-the-Rhine, Wellman, Silver Lake, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,344,244. **Direct Conversion of Aromatic Nitro Compounds to Azo Compounds by Catalytically Hydrogenating an Aromatic Nitro Compound in the Liquid Phase in the Presence of an Alkali and a Sulphactive Hydrogenation Catalyst.** W. V. Freed and F. K. Signaigo, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,344,258. **Production of Diphenyl and Benzene from a Mixture of Hydrogen Gas and Terphenyl.** F. T. Miles, Anniston, Ala., assignor to Monsanto Chemical Co., a corporation of Del.

2,344,394. **Barium Di(Dihydro-Abietyl) Dithiophosphate.** E. W. Cook, New York, N. Y., and W. D. Thomas, Jr., Stamford, Conn., assignors to American Cyanamid Co., New York, N. Y.

2,344,489. **A Polymeric Vinylidine Chloride Product Stabilized with a Dihalo-Ortho-Nitro-Phenol, in Which the Halogen Is of the Group Consisting of Chlorine and Bromine.** R. F. Boyer, L. A. Matheson, and C. L. Moyle, assignore to Dow Chemical Co., all of Midland, Mich.

2,344,494. **Impregnating Glass Fiber Thread with Latex, passing the Impregnated Thread through the Orifice of a Heated Die, the Orifice Having Such Dimensions That the Thread Is Compressed during Its Passage, and Heating the Impregnated Thread While It Is Subjected to Pressure.** W. M. Camp, Glen Ridge, N. J., assignor to Clark Thread Co., Newark, N. J.

2,344,578. **Coating Composition for Concrete Including a Non-Volatile, Water-Repellent, Film-Forming Base of Resinous Material: a Volatile Hydrocarbon Solvent for the Base, and a Metallic, Fatty-Acid Soap.** G. W. Whitesides, Anchorage, Ky.

2,344,625. **1-Amino-4-(4'-Hydroxy-Anilino)-Naphthalene-6-Sulphonamide.** H. A. Lubs and N. M. Bigelow, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,344,676. **In Producing a Resin from a Resin Oil in Which the Chief Polymerizable Constituents Are Indene-Coumarone, Styrene, and Their Homologs, at least 20% Being Styrene Homologs, the steps of Heating the Oil to Polymerize 20% to 60% of the Polymerizable Constituents by Heat Alone, Treating the Unpolymerized Constituents with a Catalyst to Form Catalytic Resin Polymer, and Blending the Products of Both Types of Polymerization to Form a Solid Blended Resin.** E. L. Cline, Philadelphia, Pa., assignor by mesne assignments to Allied Chemical & Dye Corp., New York, N. Y.

2,344,707. **Reducing a Chloropyrimidine by Subjecting It to the Action of Metallic Zinc in the presence of a Water-Insoluble Surface Active Material Added to the Reactants.** E. Kuh, New Brunswick, N. J., assignor to American Cyanamid Co., New York, N. Y.

2,344,733. **Heat-Setting Molding Composition of High Mechanical Strength, Composed of Small Particles of Glass Cloth Impregnated with a Polymerizable Aminoplastic Resin.** K. E. Ripper, Bronxville, assignor to American Cyanamid Co., New York, both in N. Y.

2,344,776. **Rubber Hydrochloride Composition Containing an Open-Chain Polyalkylene Polyamine Composed Solely of Alkylene and Amine Groups, in Which the Terminal Groups Are Primary Amine Groups.** G. E. Hulse, Passaic, N. J., assignor to United States Rubber Co., New York, N. Y.

2,344,784. **Preparing Guanamines by Reacting an Ester of an Organic Carboxylic Acid with a Biguanide in the Presence of a Caustic Alkali in Amounts Sufficient to Act as an Effective Condensing Agent.** W. N. Oldham, Old Greenwich, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,344,785. **Accelerating the Polymerization of Vinyl and Vinylidene Compounds by Exposure to Actinic Light Rich in Ultra-Violet Light.** J. S. Owens, Lancaster, Pa., and J. Heerema and G. W. Stanton, assignors to Dow Chemical Co., all of Midland, Mich.

2,344,793. **Light-Colored Coating Composition Made with an Alkyd Resin Modified with a Drying Oil, a Pigment and from 0.05 to 1% of a Wax Based on the Pigment Present.** O. W. Tissari, Philadelphia, Pa., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,344,831. **Polyvalent Metal Salt of the Condensation Product of a Material of the Group of Monomers and Dimers of Acylic Terpenes having Three Double Bonds per Molecule and a Material of the Group of the α-, β-Unsaturated Organic Acids and Acid Anhydrides, Which Material Contains less Than Seven Carbon Atoms per Molecule.** E. Ott, assignor to Hercules Powder Co., both of Wilmington, Del.

2,344,833. **Sulphonation Product Including a Mixture of a Sulphonate and a Sulphate Obtained by Reacting a Polymer of an Acyclic Terpene Having Three Double Bonds per Molecule, with a Sulphonating Agent.** A. L. Rummelsburg, assignor to Hercules Powder Co., both of Wilmington, Del.

2,344,843. **Improving the Plasticity of an Elastic Rubbery Copolymer Contained in a Synthetic Latex by Subjecting the Latex to the Action of Oxygen, and thereafter Stabilizing the Latex by the Addition of an Antioxidant.** V. E.

2,344,918. **Preparing Permanently Plastic Resinous Polymers of Compounds of the Group of Acrylic and Methacrylic Acids, Acrylonitrile, Methacrylonitrile and Esters of Acrylic and Methacrylic Acids with Saturated Alcohols.** W. S. Johnson, assignor to Rohm & Haas Co., both of Philadelphia, Pa.

2,344,926. **For Rendering Fabrics Water Repellent, a Composition Consisting of a Water-in-Oil Emulsion Containing in the Oil Phase an Organic Solvent-Soluble Condensate of Urea, Formaldehyde, and a Monohydric Aliphatic Alcohol of at least Four Carbon Atoms, Organic Solvent-Soluble Ethyl Cellulose, a Water-Insoluble Wax, and Aluminum Soap, and Organic Solvent therefor.** W. J. Thackston, Haddon Heights, N. J., and S. N. Glarum, Ardmore, assignors to Rohm & Haas Co., Philadelphia, both in Pa.

2,344,934. **Quaternary Salts of Dimethylurea Monoethers of the Formula**

$$ROCH_2.NH.CO.NH.CH_2.N(tert).Y$$

in Which R Is an Alcohol-Forming Radical Containing at least Four Carbon Atoms, N(tert) the Molecule of a Tertiary Nitrogen Base, and Y an Anion. H. J. West, Stamford, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,344,965. **A 10,13-Dimethyl Cyclopentano Polyhydrophenanthrene Compound Having in the 3-Position a Member of the Group of Hydroxyl and Groups Convertible into Hydroxyl with the Aid of Hydrolysis and Having in the 17-Position an Etherified Hydroxyl Group.** A. Butenandt, Danzig-Langfuhr, Freestate Danzig, and L. Strassberger, Berlin-Wilmersdorf, Germany, assignors by mesne assignments to Schering Corp., Bloomfield, N. J.

2,345,041. **In the Production of Alkyl Sulphotricarballylates, the Process of Dehydrating a Compound of the Group of Monoalkyl Aconitate and Monoalkyl Sulphotricarballylate to Form the Corresponding Anhydride and then Condensing the Anhydride so Produced with an Alcohol.** W. P. Ericks, Cos Cob, and E. R. Meinicke, Stamford, both in Conn., assignors to American Cyanamid Co., New York, N. Y.

2,345,095. **Process of Reacting an Isoparaffin with an Olefin in the Presence of a Liquid Catalyst Composed of Water Sufficiently Saturated with Boron Trifluoride so That Alkylation of the Isoparaffin with the Olefin Is the Principal Reaction.** F. H. Bruner, Beacon, L. A. Clarke, Fishkill, and R. L. Sawyer, Beacon, assignors to Texas Co., New York, all in N. Y.

2,345,111. **Producing Higher Molecular Polyenals.** C. Grundmann, Dessau, Germany; vested in the Alien Property Custodian.

2,345,113. **Producing Butadiene by Heating between 550° and 650° C. in the Vapor Phase a Diester Product of a Monocarboxylic Acid and a Butylene Glycol Wherein the Carbon Atoms Bearing the Hydroxyl Groups Are Separated by a Carbon Atom Free of Hydroxyl Groups.** H. Guggemos and A. Treibs, both of Munich, Germany; vested in the Alien Property Custodian.

2,345,114. **Esterifying the Olefinic Component in a Hydrocarbon Substance Containing Saturated and Olefinic Components.** H. M. Guinot, Niort, France; vested in the Alien Property Custodian.

2,345,121. **A Water-Soluble Capillary Active Compound, the Condensation Product of Ethylene Oxide with an Imide.** W. Hentrich, Rodleben, and A. Kirstahler, Dessau, both in Germany; vested in the Alien Property Custodian.

2,345,126. **Polymerized Alpha-Haloacrylic Acid Ester Compositions.** T. S. Ireland, Penketh, Warrington, England, assignor to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

2,345,138. **Production of Glycols and Their Esters by Condensation of Aliphatic Primary Aldehydes with three to six Carbon Atoms, Which Includes Heating the Aldehyde in the Presence of a Carbide of an Alkaline-Earth Metal.** H. Machemer, Burghausen, Germany; vested in the Alien Property Custodian.

2,345,170. **Manufacturing an Acetylenic Carbinol by Reacting Acetylene with a Member of the Aliphatic Aldehydes and Ketones in the Presence of Solid Potassium Hydroxide in a Solvent Medium. Including the Step of Effecting the Reaction in an Acetal as a Solvent.** J. Zeitner and M. Genas, both of Paris, France; vested in the Alien Property Custodian.

2,345,208. **Preparing a 2-Aminothiazoline by Reacting a 2-Mercaptothiazoline with an Organic Compound Containing the $\diagdown$NH Group with the Elimination of Hydrogen Sulphide.** R. A. Mathes, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,345,216. **Manufacture of Hydroxy-Aldehydes of the Saturated and Unsaturated Cyclopentanopolyhydrophenthrene Series and the Esters Thereof.** T. Reichstein, Basel, Switzerland, assignor to Roche-Organon, Inc., Nutley, N. J.

2,345,236. **Making Compounds Containing the Piperazine Ring by Subjecting Compounds Containing the Piperazino-Piperazine Ring System to Hydrogenolysis.** H. C. Chitwood, Charleston, W. Va., assignor to Carbide & Carbon Chemicals Corp., New York, N. Y.

2,345,237. **As New Chemical Compounds,**

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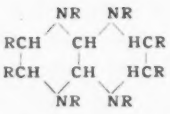


Where R is of the Group of Hydrogen and Monovalent Hydrocarbon Radicals. H. C. Chitwood, Charleston, W. Va., and Raymond W. McNamee, South Charleston, W. Va., assignors to Carbide & Carbon Chemicals Corp., New York, N. Y.

2,345,357. **Rosin-Modified Phenol-Formaldehyde Resin.** P. O. Powers, assignor to Armstrong Cork Co., both of Lancaster, Pa.

2,345,456. **Aldehyde Condensation Products of S-Benzyl Thioammeline.** H. A. Bruson, assignor to Resinous Products & Chemical Co., both of Philadelphia, Pa.

2,345,528. **An Air Drying Alkyd Resin of Low Acid Number Consisting Essentially of the Reaction Product of Diphentaerythritol, a Polycarboxylic Acid and Unsaturated Oil Fatty Acids.** T. F. Bradley, Stamford, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,345,533. **Incorporating a Finely Divided Solid Pigment in a Molten Synthetic Linear Polyamide.** G. De W. Graves, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,345,539. **An Amide of Sulphonated Cis-Endomethylene-3,6-Δ4-Tetrahydrophthalic Acid.** P. P. McClellan, Old Greenwich, and J. C. Bacon, Stamford, both in Conn., assignors to American Cyanamid Co., New York, N. Y.

2,345,543. **Colloidal Aqueous Solution of a Partially-Polymerized, Positively Charged Melamine-Formaldehyde Condensation Product.** H. P. Wohnsiedler, Darien, and W. M. Thomas, Stamford, both in Conn., assignors to American Cyanamid Co., New York, N. Y.

2,345,573. **Preparing β-Norborneol and Dinorbornyl Ether by Reacting Water with Ethylene-Cyclopentadiene Adduct in the Presence of Sulphuric Acid.** H. A. Bruson, assignor to Resinous Products & Chemical Co., Philadelphia, Pa.

2,345,574. **Polymerizing Unsaturated Hydrocarbons to Produce a Polymer Product of Relatively High Viscosity by Subjecting an Unsaturated Hydrocarbon to the Catalytic Action of Boron Fluoride.** R. E. Burk, Cleveland Heights, assignor to Standard Oil Co., Cleveland, O.

2,345,583. **Metal Object Coated with a Tenaciously Adhering Film of Dried Resinous Polymer of Cyclopentadiene.** N. K. Chaney, Moylan, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,345,597. **Reaction Product of Rubber and at Least One Phenol, Containing 1% to 5% of the Phenol Material Chemically Combined.** J. Harmon, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,345,611. **Plugging Water Formations in Wells by Introducing Therein a Liquid Resinous Composition Consisting of an Aldehyde, a Compound from the Group of Urea and Thiourea, and a Catalyst; the Mixture Is Held in Place Under Pressure, until It Has Polymerized to Form a Solid Resin Plug in the Formation.** W. B. Lerch, V. H. Mathis and E. J. Gatchell, assignors to Phillips Petroleum Co., all of Bartlesville, Okla.

2,345,625. **Para-Methyl-Alpha Methyl Styrene from Dimethyl Tolyl Carbinol.** R. C. Palmer and C. H. Bibb, assignors to Newport Industries, Inc., all of Pensacola, Fla.

2,345,629. **Embossing the Surface of a Normally Crystalline Polymer of the Group of Polymeric Vinylidene Chloride and Normally Crystalline Copolymers of Vinylidene Chloride.** J. H. Reilly, assignor to Dow Chemical Co., both of Midland, Mich.

2,345,632. **Polyamides Having the General Formula**

$$R_1CO—NH—CH—CH_2—NH—CH_2—CH_2—NH—COR_1$$

in Which R_1CO Stands for a Fatty Acyl Radicle Containing from 8 to 22 Carbon Atoms, COR_1 Is a Fatty Acyl Radicle Containing from 2 to 5 Carbon Atoms. E. A. Robinson, Chatham, and M. J. Kelley, Newark, assignors to National Oil Products Co., Harrison, all in N. J.

2,345,659. **Vinyl Resin.** A. W. Downes, South Charleston, W. Va., assignor to Carbine & Carbon Chemicals Corp., New York, N. Y.

2,345,660. **Conjoint Polymer of Vinyl Chloride and Vinyl Acetate Containing a Predominant Amount of Vinyl Chloride.** A. W. Downes, South Charleston, and J. R. Kernan, Charleston, both in W. Va., assignors to Carbide & Carbon Chemicals Corp., New York, N. Y.

2,345,700. **Producing Stable Linear Condensation Products by Condensing a Diamine Containing at Least One Hydrogen Atom with a Dicarboxylic Acid.** H. Dreyfus, London, England, assignor to Celanese Corp. of America, a corporation of Del.

2,345,717. **A Composition of a Polyisobutylene Having a Molecular Weight Between 50,000 and 350,000 and a Paraffin Wax.** L. B. Turner, Roselle Park, N. J., assignor by mesne assignments to Jasco, Inc., a corporation of La.

2,345,751. **Diolefinic Hydrocarbon from Isopropyl Alcohol.** V. N. Ipatieff, assignor to Universal Oil Products Co., both of Chicago, Ill.

2,345,946. **Polyvinyl Acetal Resin.** S. C. Overbaugh, Arlington, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,345,962. **Improved Method of Producing a Resin from a Resin Crude, the Polymerizable Component of Which Is Predominantly Material of the Group of Styrene, Styrene Homologs, Indene, and Coumarone.** E. I. Kline, Philadelphia, Pa., assignor to Allied Chemical & Dye Corp., New York, N. Y.

2,345,966. **A Liquid, Polymerizable Resinous Composition from Liquid Polymerizable Furane Derivatives of the Class of Furfuryl Alcohol and Mixtures of Furfuryl Alcohol and Furfural.** E. F. Fiedler, Adams, and G. D. Holmberg, Pittsfield, both in Mass., assignors to General Electric Co., a corporation of New York.

2,345,985. **Rutile Titanium Oxide Pigments.** R. M. McKinney, Roselle, and H. M. Stark, Arden, assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, all in Del.

2,346,036. **Cementing together Two Pieces of Cast Methacrylate Polymer by Monomeric Methacrylic Acid.** R. E. Leary, Newark, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,346,055. **Sponge-Like or Cellular Rubber from Aqueous Dispersions.** S. D. Taylor, Sutton Coldfield, and D. W. Pounder, Moseley, Birmingham, assignors to Dunlop Rubber Co., Ltd., London, all in England.

2,346,083. **Aqueous Poly-Disperse System Containing Rubber and Separate Particles of a Reaction Product of an Oil-Modified Alkyd Resin and an Organic Solvent-Soluble Carbamide-Aldehyde-Alcohol Condensate.** I. D. Robinson and F. J. Meyers, assignors to Resinous Products & Chemical Co., all of Philadelphia, Pa.

2,346,085. **Improved Titanium Pigments.** R. H. Sawyer, Linthicum Heights, Md., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,346,091. **Rutile Titanium Oxide Pigment.** H. M. Stark and J. L. Keats, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,346,102. **Alipathic, Unsaturated Mono-Mercaptan.** M. de Simo, Piedmont, and J. J. O'Connor, Oakland, assignors to Shell Development Co., San Francisco, all in Calif.

2,346,107. **Plasticizing Methacrylic Resins by Milling on Hot Rolls in the Presence of a Compound of the Group Consisting of Parium Phenanthrene-2-Sulphonate, Potassium Phenanthrene-2-Sulphonate, Sodium m-Nitro Benzene Sulphonate, Sodium 2, 4-Dinitro α-Naphthol 7-Sulphonate, Thiosalicylic Acid, Thiourea, Ethyl Crotonate, Maleic Anhydride, Phthalic Anhydride, Acetamide, α-Mono Bromo Isovaleryl Urea, and Methallyl Chloride.** W. S. Johnson, assignor to Rohm & Haas Co., both of Philadelphia, Pa.

2,346,126. **Producing Highly Fatigue Resistant Cotton Yarns and Cords by Treatment with a Dilute Aqueous Solution of an Electrolyte Composed of a Cation of a Strong Base and an Inorganic Anion, the Solution Having a pH of 8 to 13, and Twisting the Treated Yarns While Wet.** E. T. Lessig, Cuyahoga Falls, and L. Larrick, Stow, both in O., assignors to the B. F. Goodrich Co., New York, N. Y.

2,346,136. **New, Hard, Tough, and Resilient Composition Consisting Chiefly of Ethyl Cellulose in Solid Solution in Roughly Equal Parts with Partially Saponified Candelilla Wax.** S. P. Lovell, Newtonville, and H. H. Straw, Boston, both in Mass., assignors to Beckwith Mfg. Co., Dover, N. H.

2,346,228. **For Purging an Injection Molding Machine, a Composition of a Granular Mass Containing Vinyl Resin, Plasticizer, and Mildly Abrasive Filler.** L. K. Merrill, Rocky River, and W. R. Wheeler, Lakewood, both in O., assignors to Carbide & Carbon Chemicals Corp., New York, N. Y.

2,346,408. **Putty of Reclaimed Rubber, Whiting, Linseed Oil, and Gasoline.** F. W. Andrews, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,346,416. **Improvement in the Process of Producing Resins of the Coumarone and Indene Type.** E. L. Cline, Philadelphia, Pa., assignor by mesne assignments to Allied Chemical & Dye Corp., a corporation of N. Y.

2,346,425. **Stabilized Solid Composition: Urea containing 0.0001 to 1% by Weight of Caffein.** E. C. Kirkpatrick, assignor to E. I. Du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,346,440. **In a Composite Product Which Consists of Fibrous Material Adhering to Rubber, Improved Adhesion Is Obtained by Coating the Fibers with or Interposing an Intermediate Layer of Rubber Containing a Thiophenol or Aromatic Thioether, and Vulcanizing.** E. T. Lessig, Silver Lake, and E. N. Cunningham, Cuyahoga Falls, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

2,346,600. **A Thermoplastic Lacquer Composed of an Interpolymer or Isobutyl Methacrylate and n-butyl Methacrylate, a Coumarone-Indene Resin, Nitrocellulose, a Plasticizer, and a Solvent.** V. A. Navikas, assignor to Armstrong Cork Co., both of Lancaster, Pa.

2,346,612. **Allyl Ether of Diallyl Maleate.** H. S. Rothrock, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,346,657. **Isobutene and Normal Butenes.** H. S. Bloch and R. E. Schaad, assignors to Universal Oil Products Co., all of Chicago, Illinois.

2,346,702. **Vulcanizing Oil of the Genus Coffea by Reacting the Oil with Elemental Sulphur to obtain a Homogeneous Liquid Which, on Cooling, Is Substantially Free from the Sulphur, Then Adding to the Cooled Liquid about 5% Sulphur Chloride to Produce Promptly a Solid Rubbery Mass.** H. S. Polin and A. I. Nerken, both of New York, N. Y. Nerken assignor to Polin.

2,346,708. **Molded Urea-Formaldehyde Condensation Products.** L. Smidth, Houston, Tex.

2,346,726. **Alpha - Benzoyl - Aminoanthraquinones.** E. C. Buxbaum, Media, Pa., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,346,755. **A Stable Emulsion of a Water Insoluble Polymeric Organic Film-Forming Material Dispersed in a Water Phase Containing an Inherently Water-Soluble Polyvinyl Alcohol and a Water-Soluble Complex of the Werner Type in Which a Trivalent Chromium Atom Is Coordinated with a Carboxylic Acido Group Having at Least 10 Carbon Atoms.** C. B. Hemming, Parlin, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,346,783. **Separating and Recovering a Diethylene Glycol Monoalkyl Ether from a Mixture thereof Containing an Alkylene Glycol.** A. C. Plewes, South Charleston, W. Va., assignor to Carbide & Carbon Chemicals Corp., a corporation of N. Y.

2,346,791. **Sizing for Textile Fabrics Consisting of a Mineral Oil Aqueous Emulsion of a Polymerized Terpene Hydrocarbon Resin.** A. L. Rummelsburg, assignor to Hercules Powder Co., both of Wilmington, Del.

2,346,826. **Preparation of Bis-(2, 4-Diallylphenol)-4-Alkyl Phenol Sulphides.** E. W. Cook, New York, N. Y., and W. D. Thomas, Jr., Stamford, Conn., assignors to American Cyanamid Co., New York, N. Y.

2,346,858. **Interpolymer of a Monomeric Vinyl Ester of a Saturated Monocarboxylic Acid with the Reaction Product of a Frosting Drying Oil Composition with a Minor Proportion of a Member of the Class of Alpha, Beta-Ethylenically Unsaturated Carboxylic Acids and Esters, Primary Amides, Nitriles, and Anhydrides thereof.** C. J. Mighton, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,346,992. **Zinc Resinate in the Form of a High Melting Point, Permanently Refusible, Resin-Like Product.** R. C. Palmer and E. Edelstein, assignors to Newport Industries, Inc., all of Pensacola, Fla.

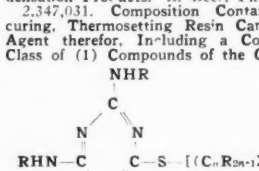
2,346,993. **Zinc-Calcium Resinate in the Form of a High Melting Point, Permanently Refusible, Clear Product Capable of Forming a Stable, Non-Gelling Solution.** R. C. Palmer and E. Edelstein, assignors to Newport Industries Inc., all of Pensacola, Fla.

2,346,994. **Zinc Resinate in the Form of a High Melting Point, Permanently Refusible Product Capable of Forming Stable, Non-Gelling Solution.** R. C. Palmer and E. Edelstein, assignors to Newport Industries, Inc., all of Pensacola, Fla.

2,346,995. **Stable, Non-Gelling Solution of a Zinc-Calcium Resinate That Can Be Isolated in the Form of a High Melting Point, Permanently Refusible, Resin-Like Product Having a Conchoidal Fracture.** R. C. Palmer, A. F. Oliver, and E. Edelstein, assignors to Newport Industries, Inc., all of Pensacola, Fla.

2,347,024. **For Impregnating Testiles, an Aqueous Solution Containing Octadecyl-Oxymethyl-Pyridinium Chloride and a Thermosetting Condensation Product of the Group of Urea-Formaldehyde and Urea-Thiourea-Formaldehyde Condensation Products.** L. Beer, Philadelphia, Pa.

2,347,031. **Composition Containing an Acid-curing, Thermosetting Resin Carrying a Curing Agent therefor, Including a Compound of the Class of (1) Compounds of the General Formula**

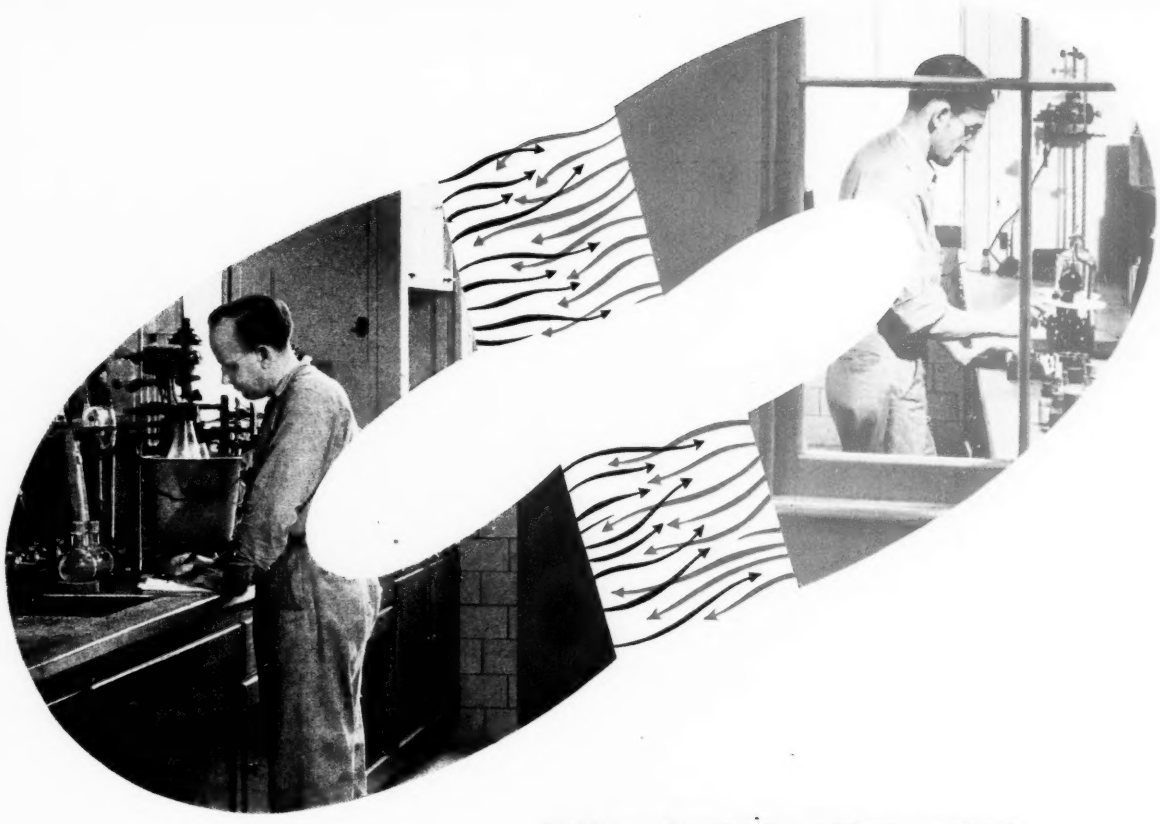


Where n Is an Integer at Least 1 and Not More Than 2, X Is a Halogen Atom, and R a Member of the Class of Hydrogen and Monovalent Hydrocarbon and Halo-Hydrocarbon Radicals; and (2) Soluble, Fusible Aldehyde-Reaction Products of the Compounds of (1). G. F. D'Alelio and J. W. Underwood, both of Pittsfield, Mass., assignors to General Electric Co., a corporation of N. Y.

2,347,103. **As a Molding Composition, a Mixture of Polystyrene and Decachlordiphenyl Which Has a Heat Distortion Temperature above That of the Polystyrene.** R. F. Hayes, North Wilmington, Mass., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,347,128. **Improvement in Production of Selenium Salts of Dithiocarbamic Acids by Reacting a Secondary Amine and Carbon Disulphide with Selenium Dioxide in Alcoholic Solution.** W. F. Russel, Norwalk, Conn., assignor to R. T. Vanderbilt Co., Inc., New York, N. Y.

2,347,132. **Converting Barton Litharge to All-Red Litharge.** R. L. Seabury, Anderson, and R. A. Daily, Muncie, both in Ind., assignors to General Motors Corp., Detroit, Mich.



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SULFURIC ACID
WETTING AGENTS

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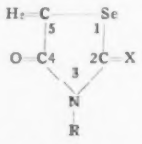
SERVING INDUSTRY...WHICH SERVES MANKIND

Dominion of Canada

419,017. **Coating of an Acid-Reacting Vinyl Resin Heat-Treated in Place with a Higher Polyalkylene Glycol to Produce a Hard, Flexible, Tough and Adherent Coating.** Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of W. N. Stoops, Charleston, and W. A. Denison, South Charleston, both in W. Va., U. S. A.

419,098. **Compounds of the Formula:**



Where R Is a Radical of the Group of Alkyl, Cycloalkyl, Aralkyl and Aryl, and X is a Substituent of the Group of Sulphur and Selenium. A. Sieglitz, Frankfurt-a.M., and P. Heimke, Frankfurt-a.M.-Hoechst, both in Germany.

419,120. **High-Molecular Weight, Thermosetting Phenolic Resin That Can Be Incorporated in Glycerdic Esters in Relatively High Proportion.** I. Rosenblum, New York, N. Y., U. S. A.

419,196. **Resin-Impregnated Compressed Wood Material.** Jicwood, Ltd., Weybridge, assignee of R. L. J. Farina, Virginia, Water, both in Surrey, England.

419,236. **Recovering Phenolic By-Products from Pre-Dried Solids Obtained from Spent Pulp Cooking Liquors and Other Lignin Containing Liquors.** E. G. Goodell, Stevens Point, Wis., U. S. A.

419,279. **Improving Titanium Dioxide.** American Zinc, Lead & Smelting Co., St. Louis, Mo., U. S. A., assignee of R. H. Monk, Westmount, P. Q.

419,338. **Isobutylene Polymers with a Molecular Weight above 1000.** Standard Oil Development Co., Linden, assignee of R. M. Thomas, Union, and I. E. Lightbown, Elizabeth, all in N. J., U. S. A.

419,339. **Improved Non-Asphaltic Linear-Type Polymers of High Molecular Weight from Isobutylene.** Standard Oil Development Co., Linden, assignee of M. D. Mann, Jr., and L. B. Turner, both of Roselle, both in N. J., U. S. A.

419,355. **A Solid Dielectric Element Including a Pentasubstituted Benzene, the Substituents Being Methyl and Halogen Groups, at Least Two of Which Are Methyl Groups and at Least One a Halogen.** Western Electric Co., Inc., assignee of Bell Telephone Laboratories, Inc., both of New York, N. Y., assignee of B. S. Biggs and S. O. Morgan, both of Summit, and A. H. White, East Orange, both in N. J., both in the U. S. A.

United Kingdom

559,338. **Thiazyl Sulphides.** R. L. Sibley and Monsanto Chemical Co.

559,359. **Adhesive Composition.** P. Frankfurther.

559,374. **Tri-p-Anisyl Bromoethylene.** F. R. Basford and Imperial Chemical Industries, Ltd.

559,452. **Resinous Copolymers.** American Cyanamid Co.

559,676. **Polymeric Materials.** E. I. du Pont de Nemours & Co., Inc.

559,682. **Unsaturated Ketones.** Shell Development Co.

559,684. **Phenol-Aldehyde Resinous Compositions.** Bakelite, Ltd.

559,711. **Substituted Amines.** E. I. du Pont de Nemours & Co., Inc., and W. J. Burke.

MACHINERY

United States

2,345,838. **Vulcanizing Press.** L. E. Soderquist and T. H. Williams, assignors to McNeil Machine & Engineering Co., all of Akron, O.

2,345,917. **Machine for Injection Molding of Plastics.** R. T. Coffman, Arlington, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,346,101. **Apparatus and Process for Curing Plastic Coatings.** E. M. Bright, Whitefish Bay, Wis., assignor to Plastic Veneering, Inc., Milwaukee, Wis.

2,346,439. **Tire Building Apparatus.** C. W. Leguillon, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,346,485. **Device for Rolling Thin Rubber Articles.** F. E. Hahne, assignor to Chemical Enterprises, Inc., both of New York, N. Y.

2,346,519. **Platen Press.** H. T. Tornberg, assignor to National Rubber Machinery Co., both of Akron, O.

2,346,973. **Vulcanizing Kettle.** W. H. Kuster, San Francisco, and E. A. Glynn, Lodi, both in Calif.

2,347,117. **Apparatus for Producing Molded Rubber Articles.** E. A. Luxenberger, G. W. Blair, and J. F. Schott, all of Mishawaka, Ind., assignors to United States Rubber Co., New York, N. Y.

2,347,311. **Tire Spreader.** C. E. Branick, Fargo, N. Dak.

UNCLASSIFIED

United States

2,345,679. **Testing Pneumatic Tire Casings.** H. J. Linse, Stamford, Conn.

2,345,993. **Forming a Tire Carrying Rim.** C. W. Sinclair, assignor to Kelsey-Hayes Wheel Co., both of Detroit, Mich.

2,346,298. **Tire Chain.** E. C. Gulesian, Boston, Mass.

2,346,301. **Apparatus to Expand Rubber Rings Serving as Drill Pipe Protectors.** F. W. Harris, assignor to Patco, Inc., both of Los Angeles, Calif.

2,346,475. **Machine to Wrap Toroidal Objects.** C. H. Desautels, Springfield, Mass., assignor to United States Rubber Co., New York, N. Y.

2,346,477. **Antiskid Device.** L. A. Ederer, Chicago, Ill.

2,346,759. **Improved Tire Cord.** T. Jackson, D. Finlayson, and T. B. Frearson, Spondon, England, assignors to Celanese Corp. of America, a corporation of Del.

2,347,086. **Machine to Form Annular Corrugations along a Tube.** N. H. Curtiss, Clifton, and T. J. Aamland, Leonia, both in N. J., assignors to United States Rubber Co., New York, N. Y.

2,347,101. **Corrugated Tubes.** W. G. Harding, Radburn, N. J., assignor to United States Rubber Co., New York, N. Y.

2,347,415. **Nonskid Device.** D. S. Kennedy, Longparish, Andover, England.

2,347,466. **Resilient Wheel.** H. H. B. Deane, Edgbaaton, Birmingham, England.

2,347,541. **Tire Pressure Indicator.** L. Critzer, Denver, and H. G. Mencimer, Fort Lupton, assignors to Automatic Air Gauge, Inc., Keenesburg, all in Colo.

2,347,622. **Wheel for a Pneumatic Tire.** C. A. Tschanz, Moody Field, Valdosta, Ga.

Dominion of Canada

419,261. **Wheel Structure.** G. A. Lyon, Allenhurst, N. J., U. S. A.

419,262. **Antiskid Device for Motor Vehicles.** A. Meredith, Edmonton South, Alta.

419,516. **Valve Assembly for a Tire Inflator Mechanism.** C. E. Wehe, Oakland, Calif., U. S. A.

TRADE MARKS

United States

406,406. **Larco.** Dental rubber products. M. Larson Co., Chicago, Ill.

406,420. **Skol.** Collapsible boats. Skol Co., Inc., New York, N. Y.

406,462. **Sweetheart.** Adhesive cloth tape. J. P. Frank & Co., New York, N. Y.

406,525. **Battlefield. Women's clothing** of rubber and rubber and fabric combinations. Zinaida Harpignies, New York, N. Y.

406,526. Double seven-sided outline containing the word: **"Orco."** Safety treads, tiling, flooring, and floor grids. Ohio Rubber Co., Willoughby, O.

406,541. Representation of a shield containing a drawing of a tree and crossed symbols and the word: **"Marathon."** Lignin products including compounds for rubber synthesis. Marathon Paper Mills Co., Rothschild, Wis.

406,558. **Larrikins.** Clothing and footwear. Allied Stores Corp., Wilmington, Del.

406,582. Representation of airplane with the words across it: **"Roger by Packard."** Footwear. M. A. Packard Co., Brockton, Mass.

406,592. Representation of a black star and the words: **"Hollywood Casino."** Footwear. Fashion Bootery, Seattle, Wash.

406,600. **Nopalcol.** Wetting and dispersing agent. National Oil Products Co., Harrison, N. J.

406,607. **Thermocote.** Cover glasses, for welders' helmets. Thermocote Co., San Francisco, Calif.

406,631. Representation of two infants' heads wearing crowns and surrounded by stars and a streamer containing the word: **"Baby-Realm."** High chair and play yard pads. M. Miller, doing business as Bancroft-Rellim Co., Boston, Mass.

406,664. **Victory.** Plastic composition for sound insulation. Sam Moore & Co., Cleveland, O.

406,670. **Strato-Cable.** Insulated wires and cable. The Whitney Blake Co., New Haven, Conn.

406,699. **"Spring About" Casuals.** Footwear. Fashion Bootery, Seattle, Wash.

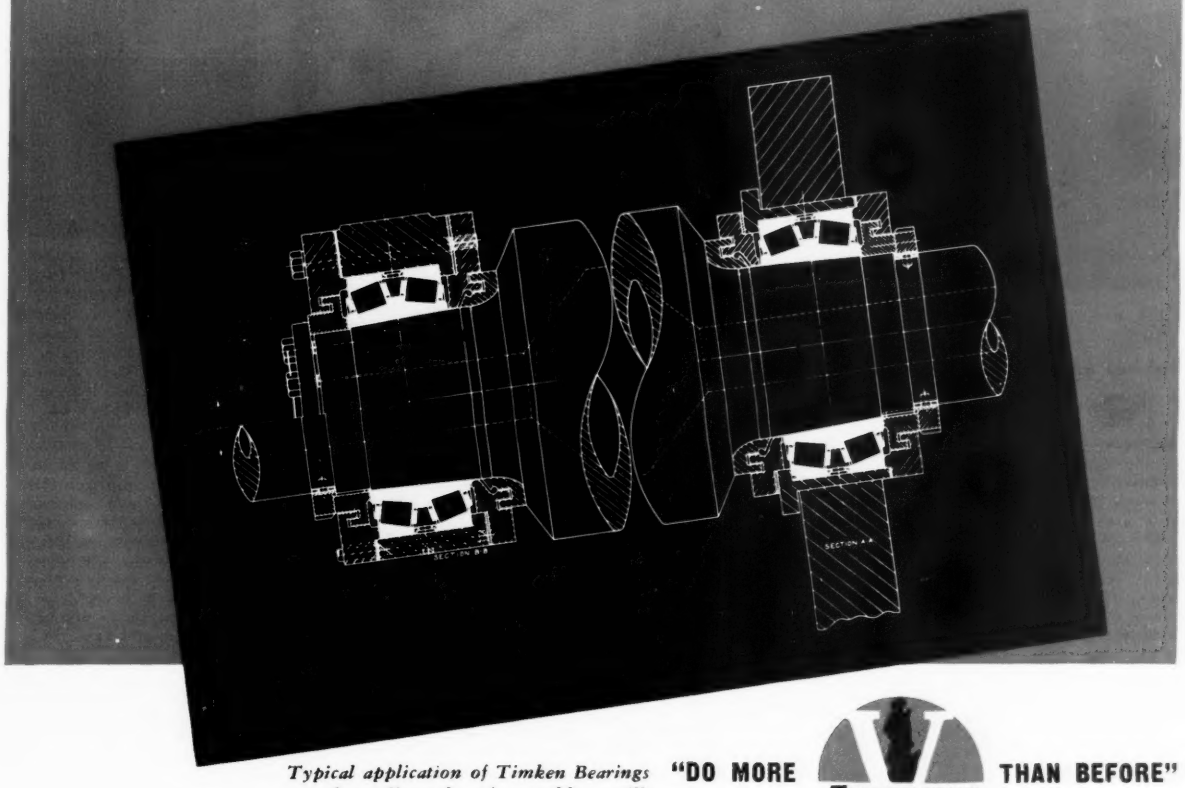
CALENDAR

June 5-7.	Canadian Chemical Conference, Royal York Hotel, Toronto, Ont., Canada.
June 6.	Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif.
June 12-July 8.	Fifth War Loan Drive.
June 22.	Rubber & Plastics Division, A.S.M.E. Semi-Annual Meeting, William Penn Hotel, Pittsburgh, Pa.
June 23.	Boston Rubber Group, Outing, Woodland Golf Club, Newton, Mass.
June 26-30.	A. S. T. M. Annual Meeting Waldorf-Astoria Hotel, New York, N. Y.
June 29.	Northern California Rubber Group.
July 22-23.	Los Angeles Rubber Group, Inc. Summer Outing.
Sept. 10-15.	A. C. S. Fall Meeting. Hotel Pennsylvania, New York, N. Y.
Sept. 13-15.	Division of Rubber Chemistry, A. C. S. Fall Meeting. Hotel Commodore, New York, N. Y.
Oct. 5-7.	SAE National Aeronautic Meeting. Los Angeles, Calif.

Rims Approved and Branded by The Tire & Rim Assn., Inc.

Rim Size	Apr., 1944
15" & 16" D.C. Passenger	
16x4.00E	61,469
16x4.50E	13,412
15x5.00E	1,575
16x5.00E	1,726
16x5.00F	8,256
15x5.50F	583
16x5.50F	1,284
17" & Over Passenger	
18x2.15B	5,367
Flat Base Truck	
17x3.75P (5")	705
17x4.33R (6")	4,942
20x4.33R (6")	29,276
15x5.00S (7")	18,100
18x5.00S (7")	719
20x5.00S (7")	278,961
15x6.00T (8")	4,537
20x6.00T (8")	76,832
22x6.00T (8")	4,070
20x7.33V (9-10")	56,046
22x7.33V (9-10")	1,234
20x8.37V (11")	3,348
Tractor & Implement	
15x3.00D	17,839
16x3.00D	101
19x3.00D	9,785
18x5.50F	5,090
20x5.50F	681
20x8.00T	212
24x8.00T	5,162
28x8.00T	472
36x8.00T	218
40x8.00T	105
W8-24	5,972
W8-32	221
W8-36	404
W8-40	95
W9-24	2,182
W9-28	1,178
W9-36	2,253
W9-38	720
W10-24	383
W10-28	6,651
W10-36	6,928
W10-38	6,693
W10-40	1,249
W11-26	796
DW7-38	184
DW9-38	11,764
DW11-26	11
DW11-28	1,388
DW11-32	378
DW11-36	2,072
DW11-38	5,438
DW12-26	1,731
DW12-30	4,230
Cast	
24x15.00	82
Total	675,110

Prepare to meet future demands in rubber NOW



Typical application of Timken Bearings on the roll necks of a rubber mill.

"DO MORE THAN BEFORE"

5TH WAR LOAN

Rubber processing equipment is subject to the same threats as industrial machinery of any kind, therefore needs the advantages of Timken Tapered Roller Bearings as much as any.

Compounding mills need them on the roll necks for smooth operation, simplified lubrication and extended roll life. There is no wear on the roll necks, as all movement takes place within the bearings themselves.

Another important point: Timken Bearings can be sealed so effectively against lubricant leakage that there is no danger of product contamination.

If the builders and users of steel rolling mills had been content to stick to plain bearings, steel production would be far from what it is today — in quantity and quality — and it is doubtful if the tremendous demands for steel to support the war effort could have been met. So why continue to use plain bearings in rubber mills? The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

New Machines and Appliances

Eemco Laboratory Mill

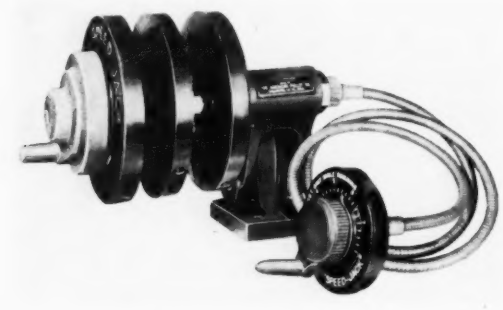
Rubber and Plastics Laboratory Mill

THE Eemco rubber and plastics laboratory mill has been designed to meet the exacting requirements of the laboratory or production in mixing and compounding natural and synthetic rubber, and for sheeting, mixing, and breaking down both thermoplastic and thermosetting materials. A convenient control provides speeds between 38 and 75 surface feet per minute. A vari-speed motor drive and gear reducer has a 5 h.p., 220-volt, 3-phase, 60-cycle motor. A 75-foot pound magnetic brake is connected to the variable speed shaft and operated by a safety switch which disconnects the motor from the power line and immediately sets the magnetic brake. Push button control starts and stops the variable speed motor drive.

Adjusting screws with a calibrated dial provide for accurate alinement of rolls. Heating and cooling of chilled iron rolls (six-inch diameter by 12-inch face), cored and equipped with an interior distributing pipe extending into the body of each roll, are controlled by a readily accessible valve. A tachometer shows the surface speed of the front roll. The semi-steel mill frames are of one-piece construction. The unit is 41 by 34 inches, and the overall height is 53 inches. The covers are easily removed to give access to the mechanism. Erie Engine & Mfg. Co., 953 E. 12th St., Erie, Pa.

Variable Speed Transmissions with Universal Mounting

THE American Speed-Jack, a variable speed transmission for drives up to one h.p., has a compact flexible shaft which makes it possible to mount the unit in any position anywhere in or on a machine, and to place the control in a safe and convenient location. The movement of the steel-faced plastic flanges, which provide accurate balance and silent vibration-free operation, is controlled mechanically. V-belts provide stepless control of speed through a three-to-one ratio. The design of the control mechanism is said to eliminate ratio-creep and to assure constant belt alinement. Practical installations may be made on mixers, ovens, milling, and many other production machines. The American Pulley Co.

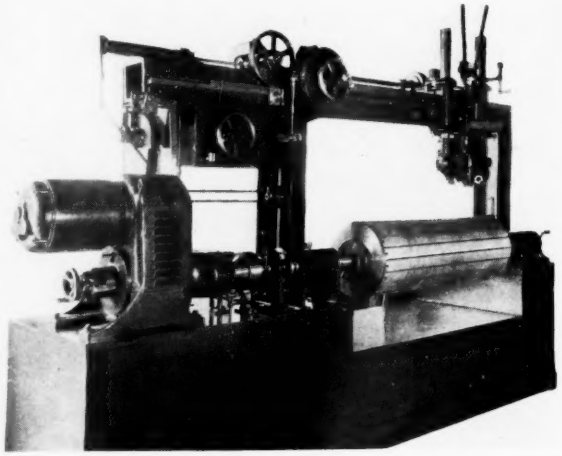


New American Speed-Jack

Expanding Mandrels for Building V-Belts

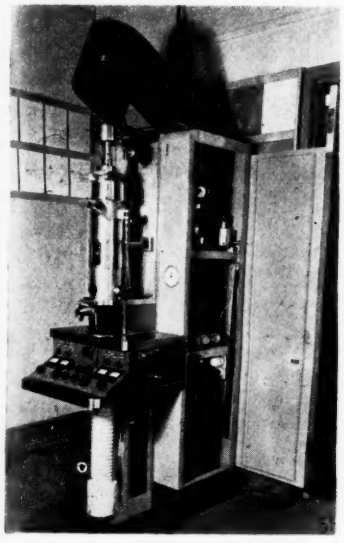
V-Belt Making Machinery

EXPANDING mandrels, a recent improvement in rubber machinery design, permits making many sizes of V-belts on the same mandrel by simple adjustment of a nut at the end. The mandrels are constructed of a steel center tube, a series of spiders with links that attach to wooden slats, and a pressure plate brought to bear on the end links by an adjustment nut. The mandrels are built in circumferences from 19 to 200 inches and in lengths from 30 to 52 inches. They were designed primarily for use in the Howe building machine and the automatic carcass cutter, lately developed for quick changeover from one belt size to another. Belt lengths, widths, and thicknesses can be quickly adjusted for by proper positioning of three calibrated dials. The cutting device uses a rotary motor-driven knife for the cut through the full depth of the belt and two straight stationary knives for the angular cuts. The machine has a five h.p. motor through a U. S. Vari-drive. Howe Machinery Co., Inc.



Automatic Carcass Cutter with Expanding Mandrel

Electron Microscope with Diffraction Camera



Interior Details of New RCA Universal Model Electron Microscope

A REDESIGNED and improved Universal Model RCA electron microscope incorporates an electron diffraction camera, which provides micrographs from information for determining molecular structure, aids in detecting impurities, and often identifies unknown substances. Electron micrographs and electron diffraction patterns may now be produced in a few minutes. Provision has also been made for making stereoscopic, three-dimensioned photos which often reveal more structural detail than pictures taken in a single plane. The new model is more conveniently operated, is said to give more uniform results, and is more easily serviced than the original produced four years ago.

The instrument is comprised of five main elements: (1) a vacuum pumping system to create a vacuum in the specimen chamber; (2) an electrical system made up of several power supplies; (3) an electron optical system which forms the microscope proper; (4) a control system; and (5) the housing. The electron optical system and the diffraction camera unit are contained in the stainless steel vertical column of the front of the instrument. The pumping system consists of an oil diffusion pump in the lower part of the column and a mechanical fore-pump mounted externally. The whole column can be pumped down in 1½ minutes. Power supplies are in the cabinet back of the column. There is an anode voltage of 50,000 volts, controlled to plus or minus one volt. Controls mounted on a sloping panel include magnification, focus, and stage positioning. The operator, sitting in front of the instrument, views the image through the glass windows just above the control board. A cable release on the panel operates a shutter exposing the plate when a photograph is taken. Direct magnification can be varied in 40 steps from 100 to 20,000 times. Resolution is better than 100 Å, making it possible to see details as small as a quarter of a millionth of

(*Continued on page 349*)

FAR EAST

CEYLON

Higher Prices for Greater Output of Rubber

For a long time there had been much agitation in Ceylon to have the price of rubber raised, and it was repeatedly pointed out by those interested that the government could not really expect a satisfactory increase in rubber output without the stimulus of better prices for, it was explained, costs were mounting on every hand, and, moreover, other commodities were getting higher prices. The British Government has finally agreed to a plan for higher prices embodying proper safeguards to insure that a rise in price would indeed be followed by a rise in production. The regular price in Ceylon for crude rubber is 1s. 2d. a pound; increases ranging from 2d. to 6d. per pound over this price will depend on the production for each quarter. For the purposes of the scheme, Ceylon's annual production will be fixed at an agreed basic figure; then the increase in price—within the stated limits—will depend on the amount by which the output for a given quarter exceeds this base; but if production for a quarter is less than the base, the price will remain unchanged at 1s. 2d. This scheme came into force on February 14, 1944, and will continue to operate until June 30, 1945.

Producers who some time ago slaughter-tapped a certain proportion of their trees get compensation for damage to the trees and are not entitled to the increase in price; they must refund the difference; but if they prefer it, they may withdraw from the Compensation Scheme, if they have notified the proper authorities in time.

Rubber Research Work, 1942

The report of work of the Rubber Research Board in 1942 only recently came to hand. The director states that the year was a difficult one for Ceylon, but that nevertheless the Research Scheme was fortunate enough to be able to continue all the main field tests as well as new trials on several subjects of immediate interest. Long-term chemical investigations were discontinued because of the increased number of special demands from the Military and Civil Defense Services on the services of the chemical department.

Among the newer investigations undertaken in 1942 were studies of the plasticity of rubber from individual trees. Work in this direction had been started at the Rubber Research Institute of Malaya, and J. D. Hastings, who had been second chemist there, continued this work in Ceylon. Mr. Hastings was returning to Malaya after his leave, but being unable to reach his destination, was temporarily employed by the chemical department of the Ceylon Rubber Research Scheme. He studied the plastic properties from the 268 best yielding trees in Dartonfield Estate. These had been selected from a total of about 10,000 trees in tapping. The latex from the 268 trees was separately coagulated, rolled, and dried under standard conditions, and the samples were tested with the Williams plastometer, and the D/10 figure—measure of hardness or plasticity—was determined.

The D/10 values ranged from 2.44 (soft) to 5.20 (hard), with a mean value of 3.86 and standard deviation of 0.54. Analysis of the data seems to indicate that there is some relation between yield and hardness—higher-yielding trees apparently give harder rubber, and lower yielding trees softer rubber; but the correlation was not statistically significant for the samples examined. Further and more careful experimentation will be required to decide the possibility of correlation. Meanwhile it is intended to establish clone trial plots from 20 trees which produced the softest and hardest rubber.

Stimulating Yields

Another line of experimentation which had its beginnings in Malaya was determining the effect on yields of scraping and applying vegetable oils to the tapping panel below the tapping cut. Such trials had been started in Malaya toward the end of 1941, and two similar tests were carried out on Dartonfield early in 1942. It was found that scraping with and without the application of palm oil and other local vegetable oils led to an immediate increase in yield of 80-100%, which fell to 50% by the third tapping, and then continued to fall until by the end of the fourth month yield was almost normal again. A third trial, set up on an estate, indicated that a light scraping was more satisfactory both with and without the application of oils than heavier scraping. The increase in yield was 70-80%, which declined as before, but at the end of the fourth

month the yield was still 15% above normal. This experiment is being continued.

Twinning

With the idea of doubling the available quantity of valuable legitimate seedling material, and also of providing identical experimental material, planters in the East, especially in Netherlands India, some years ago began to use the process of twinning for *Hevea* seedlings. Two methods were used by the Dutch, the Ramaer and the Gambar methods. In the first the young shoot is cut off just above the cotyledon node. The remainder of the young plant is then divided longitudinally so that the halves of the shoot and the root are each attached to the two halves of the seed. The Gambar method differs from the Ramaer method in the substitution of an oblique cut half way across the shoot for the complete cutting off of the top. In this way the top of the shoot remains attached to one twin; while the second is similar morphologically to a Ramaer twin.

At Dartonfield an experiment was started in 1941 to compare the growth of the seedlings obtained by the two methods of twinning with untwinned seedlings. In every case twinning resulted in a loss of growth, and there does not on the whole seem to be much difference in the effectiveness of the two methods of twinning. As might have been expected, the Gambar twin, morphologically unlike the Ramaer twins, was in general more robust than either of the latter; on the other hand the second Gambar twin was consistently weaker than the Ramaer twins.

Developing High-Yielding Clones

Among the other activities of the Ceylon Rubber Research Scheme during 1942 may be mentioned the establishment on eight estates of seed gardens for producing commercial seed. These gardens covered 28 acres, and by the end of the year budding on six gardens had been completed.

That the work of developing new high-yielding clones is a lengthy and often discouraging process is again shown by the report of the Rubber Research Scheme (Ceylon) for 1942 on studies of clones and seedling families. On the Nivitigalakele experimental plots a number of clones of high-yielding mother trees discovered on various local estates were started in 1935, and as the clones attained the proper girth, around 1941-42 tapping commenced. Results at the end of 1942 were disappointing as none of these clones appear to have given any definite indication that they would be commercially valuable. However better results were obtained with the 197 clones developed from seeds from the Prang Besar isolated Seed Gardens in Malaya; of the 197 clones 177 were in tapping by the end of 1942, and six of these clones gave over 20 grams per tapping during their first tapping year.

Another line of investigation on clones is that which aims at determining the effect of stocks and scions on yields. An experiment was set up on Mukalana Estate to determine the relationship between stock and scion on high budded trees. In this case trees were budded with Tk. 16 and B.D. 5 at three feet from the ground and were tapped with two half spiral cuts every fourth day; one cut was opened on the scion at 20 inches above the union, and the other on the stock at 24 inches from the ground. The yield from each cut was separately recorded, and it was found that as the upper cuts approached the union, the effect of the stock on the yield of the scion increased. At the same time it developed that the scions have no effect on the yield of stocks when tapped at 16-20 inches below the union.

Experiments with Fertilizers

Manuring experiments were carried out on both mature and immature trees. The former included those over seven years of age, and the latter those up to seven years old. The yield figures indicated that nitrogen may be considered the most economic fertilizer for mature rubber, but small doses of phosphate and potash also appear necessary as insurance against serious soil deficiencies.

In seedling nurseries good results were obtained with cow manure and Saphos phosphate. Cow manure and compost added to the planting hole proved beneficial. On certain acid, gravelly, and sandy soils in the wet low-country phosphate seemed to be the main requirement for young rubber, although nitrogen and potash may also be valuable here. But in a dry district the trees showed no girth response to phosphate although the general growth was below standard. No improvement was observed with the application of sulphur to alkaline soils, and the application of lime to a type of sandy soil with acid reaction even had an adverse result.

Study of Clone Diseases

By an arrangement with owners, a clone museum was opened on Kepitigalla Estate, the main purpose of which is to compare the susceptibility of different clones to the *Oidium* leaf disease.

There are now 59 different clones there, of which 22 were added during 1942.

Various clones show a marked difference in their resistance to *Phythophthora* leaf fall, consequently a number of clones have been under observation for some time, and preliminary notes have been taken on the degrees of immunity which were displayed by the individual clones.

INDIA

Among the rubber goods formerly imported, but now manufactured in India in increasing quantities are airplane tires, fire-fighting and industrial hose, mechanical rubber goods and cables. It is also expected to establish factories for the purpose of reclaiming rubber.

Of late there has been unusual activity in rubber estate transactions in the State of Travancore, South India. First it is reported that an Indian rubber syndicate has offered the British owners of Teekay Rubber Estates, Ltd., £150,000 for their rubber plantations in Travancore. These estates cover 1,752 acres, with 1,379 acres planted, of which 1,213 acres are mature. The price was said to have been acceptable to both parties.

Then the directors of Rani Travancore Rubber announced in March that a cabled offer has been received from India to purchase the entire estates of the company for £400,000, subject to British Treasury and India Government sanction. By last accounts negotiations had not yet reached the stage of a binding legal contract; however, the directors considered that, provided details could be satisfactorily arranged, it was in the interests of the stockholders to accept the offer.

Finally there were no fewer than three parties interested in the acquisition of the tea and rubber estates of the Travancore Rubber Co., Ltd. In the end the offer from J. H. Vavasseur & Co., Ltd., London, was accepted on March 1. The purchase price was reported as £219,000.

The production of crude rubber in India has been increasing, and thanks also to appropriate control measures, rubber has been used with great economy so that a comparatively large amount of rubber could be made available for the United Nations. Recently 3,500 tons were released. Local production of manufactured goods has also been progressing, and the range of articles has been extended. Output of tires for automobiles has apparently reached the stage where a surplus is available, for it is learned that China is to receive Lend-Lease tires made in India.

NEW GUINEA

Situated on the border of the west Pacific war zone, New Guinea, today is the only rubber-producing territory left to the Allies of all the rich rubber lands of the Malay Archipelago, and now comes a report of a New Guinea rubber company. The British New Guinea Development Co. has just published its interim report covering the six months ended December 31, 1943, revealing that during the last half of 1943 the amount of rubber harvested increased to 516,000 pounds, as compared with 451,000 pounds in the corresponding period of 1942. Starting July 1, 1943, the British Government agreed to increase the price of rubber from this territory from 17d. to 18½d. per pound (Australian).

NEW ZEALAND

The Reid New Zealand Rubber Mills, Ltd., Auckland, has received permission from the Ministry of Supply to resume the manufacture of tennis balls, and production for the current season is expected to reach 7,000 dozen balls—5,000 dozen for civilians and 2,000 dozen for the Armed Forces.

The war has given considerable impetus to the expansion of the rubber industry in New Zealand, and various articles formerly imported are now produced locally. The new products include pencil erasers, rubber sealing compounds, rubber solution, rubber accessories for milking machines, and raincoats.

EUROPE

GREAT BRITAIN

Interest in Plastics Growing

The Plastics Group of the Society of Chemical Industry has lately been figuring prominently in various meetings organized to present different problems connected with the plastics industry. Toward the end of February this group together with the Association of Tar Distillers held a meeting in London, when Herbert Levinstein discussed the importance of the by-products for the plastics industry. Britain has been burning millions of tons of valuable by-products of coal that could be used to supply practically all the needs of the plastics industry, he said. In 1938, for instance, 3,375,000 tons of methane, hydrogen, and ethylene, all essential for the plastics industry, had been burned in the coal gas from 38,000,000 tons of coal carbonized in that year. In the larger coke-ovens in the Ruhr, Germany, hydrogen and methane had for years been separated from commercial gas, and more recently this had been started in England too. About 10 tons of ethylene a day could be produced by coke oven plant, and if only half of this were recovered and converted into vinyl chloride, the proceeds at today's market price would be £5 for every ton of coal carbonized, or a total of around £1,825,000. American progress in developing processes for making acetylene from methane might reduce the importance of carbide, but carbide was still necessary for cyanamid, and it was a reflection on Britain that with its enormous production of coal, all the cyanamid required in the country was imported, when the process for making it from carbide and nitrogen had been known for a generation. Proper development of a British plastics industry would also require the encouragement of petroleum refining here, Dr. Levenstein emphasized. Besides, taxes would have to be removed from motor spirit and other raw materials necessary for the manufacture of plastics.

On March 15 the Plastics Group jointly with the Physical Society met in London, when the program included a lecture on "The X-Ray Examination of Plastics" by W. T. Astbury.

Finally the Group held a symposium in London on the electrical properties of plastics, when the following papers were presented: "A Survey of Thermal Plastics as Dielectrics" by H. A. Nancarrow; "The Principles of High Frequency Heating," L. Hartshorn; "Tracking", E. Rushton.

While on the subject of plastics some further particulars may be added regarding Plastics Processes, a company recently formed with a capital of £10,000 to manufacture all plastics materials. The new concern is wholly owned by F. McNeill & Co., roofing contractor and manufacturer of building materials, which has an issued capital of £200,000. The chairman and managing director, C. W. R. Pantlin, is also chairman of the first board of Plastics Processes; the other directors of the new company are Reginald Woods, managing director, and R. H. G. Wilson, who is also a director of the McNeill firm.

Institution of the Rubber Industry

The Colwyn Gold Medal for 1943 was awarded to A. Healey for conspicuous services in connection with the technique of tire manufacture especially on problems in the use of synthetic rubbers.

The results of the President's Competition for best papers submitted in 1943 have just been announced. No papers came in from members under 25 years of age; so both prizes offered were awarded in the senior section. The winners were:

First prize, R. J. Tudor, India Rubber, Gutta Percha & Telegraph Works Co., Ltd., Silvertown; second prize, J. A. Hardman, British Tire & Rubber Co., Ltd., Leyland.

Recent I. R. I. meetings included the following: Midland Section: March 13, Birmingham, Paper on "Fire Hazards in the Rubber Industry" by H. E. Davis. Leicester Section, March 16, Leicester, "The Design Engineer and the Manufacture of Bonded Rubber Units", R. D. French. London Section, April, London, the twentieth annual general meeting. C. A. Robertson, of P. B. Cow & Co., Ltd., discussed "Rubber Dinghies." At the meeting the following were elected to the Fellowship of the Institution of the Rubber Industry: F. D. Ascoli, Sir George J. Beharrell, Lord Colwyn, F. G. W. King, J. W. Maples, S. T. Rowe, and J. J. Wilson. The following Associates were also elected to the Fellowship: J. R. MacF. Duncan, chief chemist, Craigpark Electric Cable Co.,

Ltd., S. D. Sutton, manager and chief chemist, Veedip, Ltd. The following were elected to the Associateship: F. S. Breuer, by examination, Harry Ellison, J. D. Hastings, D. Kavanagh, by examination, R. W. Parris, H. J. Tew, by examination. The following passed the examination and were elected to the Licentiateship: N. Bowers, R. Clay, S. B. Cant, W. D. Cockbain, A. T. Davenport, K. B. Larbey, R. McKinnon, G. D. Morrison, W. Salisbury, R. T. Seville, T. Shepherd, D. J. Trayler, and D. S. White.

Company Notes

After 43 years' service with the Northwestern Rubber Co., Litherland, Liverpool 21, Secretary E. H. Maskell resigned. He has been succeeded by Neville L. Brockbank, his assistant for many years.

British Insulated Cable paid a final dividend of 10% on the ordinary stock and a cash bonus of 5%, again making a total of 20%, for 1943. The results for the year show profit of £1,130,253, against £1,149,031 in the preceding year.

GERMANY

Phase Angle Measurements in Connection with High Frequencies

Most synthetics usually employed for insulation show a characteristic absorption of electrical energy in the electric alternating field accompanied by the development of heat and an anomalous dispersion of the dielectric when the frequency is increased. Dielectric losses occur in non-homogeneous plastics formed of resins combined with fillers as well as in homogeneous polymerizates—but in the latter case usually only when the molecules are polar in the sense of the Debeye dipole theory. At the Kaiser-Wilhelm-Institut für Physikalische Chemie und Elektrochemie, Berlin-Dahlem, it was proposed to explore the causes of undersirable losses in insulation and, if possible, to reach some conclusions on the molar structure and the constitution of the high polymers, from phase angle measurements, a task undertaken by W. Holzmuller

In the case of polar fluids in non-polar solvents, the Debeye theory permits an insight into molecule size and viscosity of solvent. This theory, however, is not applicable to solid polar substances, so that for solid masses the Wagner theory was preferred. Both Wagner and Debeye found the following formulae (1) for the phase angle and (2) for the dielectric constant (or the real part ϵ' of the complex dielectric constant ϵ):

$$(1) \qquad \mathrm{tg}\delta = \frac{A\omega T}{B + \omega^2 T^2}$$

$$(2) \qquad \epsilon' = C\left(1 + \frac{A}{1 + \omega^2 T^2}\right)$$

Here A, B, C, are constants, $\frac{\omega}{2\pi}$ is the frequency, and T a material constant called the relaxation time.

As equations 1 and 2 indicate, the same course of the phase angle results if ω is altered and again if the relaxation time T is altered. As T is strongly influenced by temperature, it was expected that the dependency of the phase angle and dielectric constant would correspond qualitatively to the dependence on the wave length.

A large number of phase angle and dielectric constant measurements were made on homogeneous polymerizates at a frequency of 10^6Hz, at temperatures ranging from 20 to 130° C. Incidentally extensive softening of the tested samples was observed within this range.

The measurements were made with a new type of bridge in which, unlike the usual bridges, only one component of the alternating voltage is balanced against the diagonal branch of the bridge; on the other hand, the tension still remaining on the diagonal of the bridge is measured by means of a sensitive tube voltmeter. Two additional tube voltmeters permit the measurement of the tensions which occur at the loss condenser and at the comparison condenser serving for the partial equilibration of the bridge.

Like the Schering bridge, this arrangement also permits the use of any desired voltage and hence the observation of the dependence of the phase angle on the intensity of the field. Another advantage is that the measuring condenser can be grounded on one side so as to permit the heat created by the losses to be discharged while the

temperature can be determined directly on the condenser plates by means of the thermo-element. A generator with counter-vibrating [push-pull connected?] tubes serves to generate the high frequency.

All substances tested showed an increase in the phase angle as the temperature rose; $tg\delta$, however, does not increase to an unlimited value; on the contrary, the value attains a maximum at a certain temperature and, if heating is continued, drops again. The dielectric constant ϵ' increases considerably within the same temperature range. Polyvinyl acetate, polyvinyl alcohol, and Novolak show different maxima. In polyacrylic acid materials the dielectric constant increased so rapidly that measurements were not continued above temperatures of 110° C. Tests were also carried out with high and low polymeric polyvinyl chloride, and the values obtained for the dielectric constants appeared to indicate that measurements are very little influenced by the size of the molecule, from which it was further deduced that, unlike simple polar fluids, in the case of the high molecular substances it is not the molecule as a whole that is responsible for the dielectric losses, but only parts of the molecule.

When varying proportions of polyacrylic acid methyl ester, as a polar substance, were polymerized with polystyrol (which is known for its unusually small dielectric losses) there was, at room temperature, an increase in the phase angle approximately proportionate to the amount of polyacrylic acid methyl ester present. In a mixed polymerizate in which the proportion of polar substance was 21.7%, there was a maximum phase angle $tg\delta = 3.5 \times 10^{-2}$ at 95° C.; whereas for pure polyacrylic acid methyl ester, this was $tg\delta = 9.15 \times 10^{-2}$ at 47° C.

On the theoretical side it was explained that as in the case of fluids, the cooperation of Brownian thermal movements and orientation of the dipoles in the direction of the field play an important part. The individual dipole axes, of which each molecule has a large number, are held fast in certain positions by binding forces in the molecule (retaining of the 110 tetrahedron angle) and by forces from neighboring molecules. In general they will oscillate about these positions, and only powerful thermal collisions will cause the individual molecules to leave these most probable positions in order to occupy for a longer or shorter period a different position with a different potential energy toward the surroundings. So that if an electrical field is laid out, the statistical distribution of the dipole axes will be changed, and a direction agreeing better with the direction of the field will be preferred. But since the change in position can only be brought about by powerful collisions, a time T will elapse before the distribution characteristic for the prevailing field intensity sets in. If the field is disconnected, then the, now improbable, distribution is at first retained and shows increased potential energy. That is to say, energy is withdrawn from the alternating electrical field as soon as the adjustment to the probable distribution lags behind the field, and this energy is converted into heat.

While the tests were being carried out, temperature had to be constantly watched, and measurements had to be made as quickly as possible. Error was chiefly due to temperature and only in the second place to electrical movement. The measurements were considered of particular interest for determining how molecules behave in a constantly changing electrical field, which should lead to a better insight into the solid state. For such investigations the ideal material would be a stretched hydrocarbon chain in which the electron distribution is distorted by the introduction of polar groups at definite points. In this connection measurements on polyesters and polyamides were considered to hold promise.

Electron Microscope

(*Continued from page 343*)

an inch.

A specimen to be examined is "illuminated" by directing a concentrated beam of electrons, generated by a heated wire filament, through it. The electrons, in passing through the specimen, are affected to varying degrees according to the density and composition of the various parts. The electron beam emerging from the far side of the specimen bears the pattern or "image" of the specimen magnified as much as 20,000 times. The specimen is unharmed by such a concentrated bombardment of electrons. The new model requires only 25 electron tubes in comparison with 51 in the original.

A smaller console model, 50,000 times more powerful than the ordinary optical microscope, makes possible magnification of minute particles up to 100,000 times. It plugs into an ordinary light socket for its power source. Although the diffraction camera unit has been eliminated from this model and the number of magnification stages reduced, it will likely find wide application in laboratories, schools, and industrial plants. RCA Victory Division of Radio Corp. of America.

Editor's Book Table

BOOK REVIEWS

"The Chemical Formulary." Volume VI. H. Bennett, Editor-in-Chief. Published by the Chemical Publishing Co., 234 King St., Brooklyn, N. Y. 1943. Cloth, 8½ by 5½ inches, 636 pages. Index. Price $6.

This collection of practical formulae for making thousands of products in the rubber, resins, plastics, adhesives, emulsions, and about 15 other industries offers tested recipes ranging from artificial rubber latex to a zinc coating for iron. Some of the formulae have been used commercially; others have been obtained from patent literature, a source less valuable because of errors and omissions. Because many chemical products, however, are not definite chemical compounds, but mixtures or complex blends, the formularly fills a current need of a modern compilation. The literature in the past has been scattered, meager, and outmoded. The volume will save chemists and allied workers time and effort.

Rubber formulae include recipes for rubber preservatives, eraser rubber, leather-like stiff rubber, synthetic rubber gear composition, golf-ball cover composition, neoprene gasket and packing (British patent), "Thiokol" printing roller, and a method of reclaiming rubber. Butyl compounds for wire insulation and molded good, three Buna S compounds, and German patents for Buna N and Buna S are also given.

A list of substitutes or alternatives for about 300 scarce chemicals and products may be of assistance to many users of the volume. Several time-saving tables and a long list of materials and their suppliers add utility to the encyclopedia.

"A.S.T.M. Standards on Rubber Products (with Related Information)." Published by the American Society for Testing Materials, 260 S. Broad St., Philadelphia 2, Pa. February, 1944. Paper, 9 by 6 inches, 424 pages. Price $1.75.

Tentative specifications for rubber and synthetic rubber compounds for automotive and aeronautical applications prepared by Technical Committee A on Automotive Rubber is an important addition to the latest volume of standards prepared by the A.S.T.M. Committee D-11 on Rubber Products. Also included for the first time are specifications for rubber and synthetic rubber insulation for wire and cable; methods of testing rubber-coated fabrics and asbestos sheet packing; new methods of specifications and tests for non-rigid plastics; and three electrical test methods applicable to rubber products.

In addition to 24 general methods are several specifications and methods of test for rubber hose and belting; rubber gloves, matting, and tape; and latex, rubber cements, sponge and hard rubber products.

Several proposed specifications, which have not been formally approved by the Society, are included in draft form for the purpose of soliciting comment. Emergency alternate provisions applying to some standards have been printed on colored paper and bound into the volume in their proper places.

"Manual of Laboratory Glass-Blowing." R. H. Wright. Published by Chemical Publishing Co., Inc., 234 King St., Brooklyn, N. Y. 1943. Cloth, 8½ by 5½ inches, 90 pages. Index. Price $2.50.

This concise book covers the fundamental operations of glass blowing required to produce various kinds of jointed glass tubing used in chemical and physical laboratories. Methods of making more difficult things, such as condensers, diaphragm manometers, thermometer wells, vacuum jackets, mercury vapor pumps, and the McLeod gage, are also described. Because laboratory technicians are sometimes called upon to make apparatus for special purposes, they will also find helpful the directions for such operations as sealing in wires, ground joints, arc welding platinum electrodes to platinum wires, and cemented joints. A short non-technical account of glass and gas, the glass blower's materials, and of the tools used is given in introductory chapters. There are 11 plates illustrative of the text.

"Chemical Engineering Catalog." 1943-44. Twenty-eighth Annual Edition. Published by the Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. Cloth, 11¼ by 8½ inches, 1513 pages. Indexed.

Concise and accurate data on equipment, machinery, laboratory supplies, heavy and fine chemicals, and raw materials used by the chemical and related industries, including rubber, have been provided by about 550 firms for the current issue of this standard reference work. The technical data section includes a new humidity chart and various other charts, tables, and monographs, some now out of print, others never previously publicly published. The book section, with brief descriptions of more than 2,500 books in English, has been brought up to date and constitutes a comprehensive bibliography of chemical technology.

NEW PUBLICATIONS

"A 2-Way Street." Carrier Corp., Syracuse, N. Y. 32 pages. The background and methods of operation of the Carrier Institute of Business, a venture in employee education, is described in text and illustrations in this booklet. Such topics as finance, production problems, government relations, and research form the materials of the lectures. The publication will be of interest to executives concerned with long-range problems of industrial relations.

"Witcarb R. A New Reenforcing Pigment for Rubber and Synthetic Rubber." Witco Chemical Co., Witco Research Laboratories, 6200 W. 51st St., Chicago 38, Ill. Report 44-2. April, 1944. 20 pages. Witcarb R, a precipitated calcium carbonate pigment of ultra-fine particle size about equal to that of EPC channel black and for which exceptional reenforcing properties, when used in natural rubber, reclaim, and all types of synthetic rubbers, are claimed, is the subject of this bulletin. Physical properties, including electron micrographs of particle size are given, and test results with Witcarb R in loadings up to 200 parts on 100 parts of smoked sheets and GR-S are listed and discussed with the help of graphs. A comparison of Witcarb R with eight other commercial pigments in smoked sheets and GR-S is similarly presented. In addition the effect of increasing the amount of para-coumarone indene resin in a GR-S stock containing 40 volumes of Witcarb R is described. A summary of the effects on tensile strength, tear resistance, modulus, and hardness of Witcarb R in natural and GR-S rubbers is given in which the optimum loadings are indicated. It is stated that the reenforcing properties of this pigment are due in part to the extremely small diameter of the individual particles of calcium carbonate and the essentially spherical shape of these particles.

"Goodyear Engineering Data for V Belts." Goodyear Tire & Rubber Co., Akron, O. 34 pages. The data in this booklet, reprinted from the "Goodyear Handbook of Belting," are designed to give useful information in choosing the correct belt for various types of industrial machinery. Included are methods for calculating belt drive, belt section and sheave diameters, pitch length of belt, and number of belts required. The material on belt design and service factors has been given considerate attention. There are tables for horsepower rating per belt at 180° arc of contact.

"Philblack A." Phillips Petroleum Co., Bartlesville, Okla. Bulletin No. 1-44. 28 pages. The first of a new series of carbon blacks called Philblack A and made mostly from a petroleum oil by a process developed by the Phillips Petroleum Co., is described in this bulletin. Philblack A is stated to be a high pH black with low volatile matter, low moisture content, low acetone extract, and low ash and to be a fast curing black, requiring less acceleration, whose stocks approach those of channel black in abrasion resistance and tensile strength, but retain the low hysteresis, good plasticity, and easy processing characteristics of the semi-reenforcing types. Also at equal loadings and acceleration, Philblack A stocks display high modulus. Unusual extrusion properties with a reduction of processing time are claimed for stocks containing this new black, and it is stated that tire tests reveal that Philblack A imparts particularly good cut and crack growth resistance to GR-S treads. The general properties of Philblack A in GR-S and in smoked sheets are compared with those of HPC channel black, SRF furnace black, and FT thermal black in formulations containing from 20 to 80 parts of the various blacks in the two rubbers, and the results are illustrated graphically. Processing and extrusion evaluations of Philblack A, EPC, SRF, and FT blacks were made by the method of Garvey, Whitlock & Freese,[1] and the results reported in a series of photographs. Information is included on Philblack A in tread, inner tube, and carcass stocks, and the bulletin is concluded with a discussion of the effect of variable black and sulphur dispersion on flex life and hysteresis properties.

[1] *Ind. Eng. Chem.*, 34, 1309 (1942).

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CALENDER SPREADING DEPT. FOREMAN WANTED BY SMALL rubber company in New England manufacturing products very essential to war effort. Permanent postwar position with excellent chance for advancement to bigger position. Please state experience, age, draft status, and salary expected. Address Box No. 841, care of INDIA RUBBER WORLD.

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EXCELLENT OPPORTUNITY AND POSTWAR FUTURE WITH established manufacturer. Salesman with knowledge of rubber chemistry to merchandise product required by manufacturers using rubber compound. Address Box No. 845, care of INDIA RUBBER WORLD.

WANTED: RUBBER CHEMIST EXPERIENCED IN compounding tire repair materials, mechanical goods from natural or synthetic rubber. Address Box No. 849, care of INDIA RUBBER WORLD.

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with considerable experience in this line and capable of handling not only factory adjustments but Recapping and Repair Departments. Applications held in strict confidence.

THE NORWALK TIRE & RUBBER COMPANY
Norwalk, Connecticut

PROGRESSIVE MEDIUM-SIZED RUBBER COMPANY HAS OPENing for a chemical engineer experienced in rubber and synthetic rubber compounding. Knowledge of fabric coating desirable. State full particulars and salary desired. Address Box No. 847, care of INDIA RUBBER WORLD.

WANTED: PRODUCTION CHEMIST AND MANAGER FOR EXtruded Synthetic Rubber Band Tubing in small Midwestern city with postwar opportunities. Give complete records and salary expected. Address Box No. 848, care of INDIA RUBBER WORLD.

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WANTED: TIME-STUDY MAN FOR PROGRESSIVE SMALL RUBber company located in fine resort area. Permanent job with good postwar possibilities. MARTIN RUBBER COMPANY, INC., Long Branch, N. J.

SITUATIONS WANTED

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CHEMIST EXPERIENCED IN THE DEVELOPMENT OF COMpounds and factory production of synthetic and reclaimed rubber products desires change. At present employed. Any location. Address Box No. 843, care of INDIA RUBBER WORLD.

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RUBBER CHEMIST—EXPERIENCED COMPOUNDER, TIRE, TUBE, camelback, repair materials, patches, mechanicals, and specialty compounds. Also in their production, processing, and development, either natural or synthetic rubber. College graduate, draft exempt. Address Box No. 856, care of INDIA RUBBER WORLD.

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ENGINEER NOW EMPLOYED BY A MIDWESTERN RUBBER company, manufacturer of mechanical molded, extruded, and sheet goods, desires new location, 32 years' old, 7 years' experience in mold and die design, production set-up, sales engineering. Also experience in laboratory work and cost estimating. Address Box No. 860, care of INDIA RUBBER WORLD.

(Classified Advertisements Continued on Page 356)

"General Silentbloc." The General Tire & Rubber Co., Akron, O. 34 pages. This illustrated booklet describes the construction, performance, and applications of Silent-bloc bearings, mountings, and couplings for aeronautical, automotive, and industrial machinery and equipment. These concentric metal cylinders joined by a layer of rubber under pressure depend upon a mechanical adhesion rather than a chemical bond to absorb effectively vibration, correct misalignment, and provide torque action. The cylinders will sustain axial, radial, conical, and torque loads.

"Commemorating the 50th Anniversary of the First Kelly-Springfield Tire, 1894-1944." The Kelly-Springfield Tire Co., Cumberland, Md. 28 pages. This illustrated brochure describes the performance of the various types of rubber tires produced by the company in the past 50 years.

"Cumate and Cuprax Accelerators for GR-S." R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. Booklet No. 3. April 26, 1944. 20 pages. This booklet announces two new accelerators, both chemical compounds of copper, for use in obtaining faster curing compounds of GR-S. Cumate is reported as cupric diethyldithiocarbamate, and Cuprax as the cupric salt of mercaptobenzothiazole. The booklet presents much data under general properties on, Cumate *vs.* Methyl Tuads and Ethyl Zimate as primaries, Cumate *vs.* Methyl Tuads and Ethyl Zimate as secondaries with Altax, Cumate as secondary with Altax and reduced sulphur, Cuprax *vs.* Captax, Cuprax with reduced sulphur, Cumate in dry heat cured cement, and Cuprax in open steam cures. Under commercial compounds data are given on Cumate in GR-S compounds for soles and heels, inner tubes, field wire insulation, and cable jackets. A summary of the effects of these new accelerators on curing rates, aging, heat build-up, and sulphur required in GR-S compounds containing Cumate and Cuprax as primary and secondary accelerators is included. The data presented in this booklet supplement the report given on the use of copper with GR-S as reported by A. A. Somerville, of the Vanderbilt company, in his recent paper before the meeting of the Division of Rubber Chemistry, American Chemical Society, in New York in April.

"A New Opportunity for All Textile Men Through Research." Textile Research Institute, Inc., 10 E. 40th St., New York 16, N. Y. 30 pages. A concrete program to coordinate and render more effective all the research activities of the textile industry in the interest of competing with paper and other products for a larger share of the postwar consumer's dollar is explained in this pamphlet. The work of the Institute in fundamental, applied, and economic textile research is outlined. A financial plan for maintaining the Institute is given with detailed mention of the many ways in which supporting members and the industry at large will benefit.

"GR-S Friction Stocks, Altax, DPG, Selenac Acceleration, Using Galex." Technical Service Bulletin No. 20. Thiokol Corp., Trenton, N. J. 2 pages. Two formulae for GR-S friction stocks using a thiazole-type acceleration are presented with unaged and aged physical test data in this report. A slow-curing compound prepared with a mixture of benzo-thiazyl-disulphide-DPG and Selenac has suggested usefulness for steam hose or hot materials conveyer belt friction. An increase in the amount of Selenac will increase the rate of cure.

"Neoprene (GR-M). Safeguarding Workers Handling Synthetic Rubber in the Rubber Industry." Rubber Series No. 1. Division of Labor Standards, United States Department of Labor. United States Government Printing Office, Washington 25, D. C. 1944. 48 pages. 10¢. Prefaced by a brief survey of the government's rubber program, this bulletin describes the production of GR-M and discusses fundamental requirements for the conservation of the health of workers in the industry. The survey indicates that no new hazards are involved in processing GR-M. Few materials unfamiliar to the natural rubber industry are involved, and these are receiving intensive study. A chapter dealing with the engineering control of vapors discusses general ventilation and describes special applications for localized exhaust.

"Farrel Manger Couplings." Farrel-Birmingham Co., Inc., Ansonia, Conn. 8 pages. Space limitation often requires installation of a close-coupled connection. A simply constructed coupling which permits complete flexibility between driving and driven units in a much smaller space than ordinary couplings occupy is described in this illustrated bulletin. Engineering details, application diagrams, and tables of sizes, ratings, and dimensions are given.

"Wartime Prices. Part 1. August 1939 to Pearl Harbor." John M. Blair and Melville J. Ulmer under the direction of Saul Nelson. Bulletin 749. United States Department of Labor, Bureau of Labor Statistics. U. S. Government Printing Office, Washington 25, D. C. 1944. 272 pages. 35¢. This general review of price movements in the United States from the invasion of Poland to the attack on Pearl Harbor is mainly based on price data collected by the Wholesale Price Division of the Bureau of Labor Statistics. It covers foods, textiles, fuels, metals, paper, chemicals, rubber, and other commodities. The short summary on crude rubber presents the various factors responsible for the fluctuations in prices, stocks, imports, and consumption during the tense period of defense activity.

"Tomorrow's Public Relations. A Blueprint for American Business." Edward L. Bernays, 9 Rockefeller Plaza, New York 20, N. Y. 32 pages. **"Guide to Cost Study in Corporation Post-war Planning."** National Association of Manufacturers of the United States of America, 14 W. 49th St., New York 20, N. Y. 28 pages. **"A Planned Program** to Enable You to Plan Your Peacetime Hodgman Sporting Specialties Now." Hodgman Rubber Co., Framingham, Mass. 20 pages. **"Training Teamwork."** War Manpower Commission, Washington, D. C. 16 pages. **"Calibration of Testing Equipment."** Foster D. Snell, Inc., 305 Washington St., Brooklyn 1, N. Y. 6 pages. **"Rules for Inflating and Mounting All-Synthetic Tubes."** B. F. Goodrich Co., Akron, O. 4 pages. **"Summary of Safety and Savings with All-Purpose Pyranol Transformers."** General Electric Co., Schenectady, N. Y. 16 pages. **"Softball."** Official Bulletin No. 7 Keds Sports Department, United States Rubber Co., 1230 Sixth Ave., New York 20, N. Y. 20 pages. **"Your War Garden for 1944."** Firestone Tire & Rubber Co., Akron, O. 28 pages. **"Fourteenth Report to Congress on Lend-Lease Operations.** For the Period Ended December 31, 1943. "Superintendent of Documents, United States Government Printing Office, Washington 25, D. C. 84 pages. **"General Properties and Characteristics, Allymer C. R. 39."** Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh, Pa. 4 pages.

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Market Reviews

COTTON & FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

	Mar. 25	Apr. 29	May 6	May 13	May 20	May 27
Futures						
July	20.63	20.88	20.91	20.80	20.93	21.06
Oct.	19.99	19.83-19.84	19.96-19.98	19.86-19.88	19.92	20.16-20.19
Dec.	19.80	19.61	19.70	19.60	19.67	19.91
Jan.	19.73	19.53	19.62	19.52	19.59	19.85
Mar.	....	19.40	19.48	19.37	19.41	19.69

DURING the first half of May cotton prices held generally steady, but eased slightly in the second week because of continued improvement in Cotton Belt weather and uncertainty about future cotton consumption. A slight upward trend was noticed about mid-May, but developments in the trade on the whole have not been conducive to higher prices. The 15/16-inch spot middling price closed May 1 at 21.51¢ and fluctuated within narrow limits. It rose to 21.70¢ on May 15, dropped to 21.62¢ on May 20, and closed at 21.91¢ on June 1.

Revised cotton acreage estimates total 21,219,000 acres, 3.35% under the 21,942,000 acres in cultivation last July. Crop preparations and plantings are unusually late because of excessive rain and labor shortage.

The Bureau of the Census reported May 15 that cotton consumed in April was 776,007 bales of lint and 110,659 of linters, against 902,102 and 115,502 in March, and 939,178 and 104,701 in April, 1943. Cotton on hand April 30 in consuming establishments totaled 2,221,800 bales of lints and 440,497 of linters, compared with 2,421,094 and 478,845, respectively, April 30, 1943. In public storage and at compresses 10,276,595 bales of lint and 88,264 bales of linters were on hand, against 10,601,339 and 79,327 last year. It is estimated that the government controls 53% of cotton stocks, contrasted with 42% last year.

Fabrics

A demand for practically all textiles beyond any possible supply in both yarns and cloth continued in May. Demands for ducks, drills, and sheetings were incessant. These are substantially unavailable for current delivery and for two to four months ahead. Military demand to rubber manufacturers for sheetings was on an increasing scale. Virtually no changes have occurred in prices.

The market remained nervous over Washington developments. Under consideration is a government plan to impose increasingly rigid controls over production of cotton textiles either through extension of the preference rating system or by direct allocation.

Robert C. Jackon, of the National Cotton Council, charged May 10 at a House Banking and Currency Committee session that OPA ceiling policies for cotton textiles are limiting production of essential fabrics. He urged that cotton goods ceilings be based on parity price of cotton, plus manufacturing costs for 90% of the item and a reasonable profit, to which OPA has officially objected.

The 48-hour week was inaugurated in the cotton textile industry May 14 to expand production. No very clear indication of the results has been forthcoming. Wage and cost questions continue important.

Amendment 2 to Limitation Order L-99, effective May 21, specified that weekly production and delivery of duck yarns must be equal to the output in the highest production week of 1944. Some saw in the ruling indications that civilians are facing a more critical shortage of cotton goods than experienced in the past.

Observance of Cotton Week, May 22 to 27, by manufacturers, wholesalers, and retailers emphasized the wartime role of cotton.

Reclaimed Rubber

THE demand for reclaimed rubber in May was somewhat less heavy than in April. The cause may be assigned to a recent regulation permitting the use of GR-S in camelback. Demand from other branches of the rubber industry continued unabated at a high level. It is expected that several months will elapse before synthetic reclaim, especially of the GR-S type, is obtainable in good volume. More than 1,000,000 pounds have been reclaimed, and it is estimated that about 5,000,000 pounds of synthetic rubber scrap is available.

Reclaimed Rubber Prices

	Sp. Grav.	¢ per Lb.
Auto Tire		
Black Select	1.16–1.18	6½/ 6¾
Acid	1.18–1.22	7½/ 7¾
Shoe		
Standard	1.56–1.60	7 / 7¼
Tubes		
Black	1.14–1.26	11¼/11½
Gray	1.15–1.26	12⅛/13¼
Red	1.15–1.32	12 /12¼
Miscellaneous		
Mechanical blends	1.25–1.50	4½/ 5½
White	1.35–1.50	13½/14½

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

Compounding Ingredients Price Changes

Activex	lb.	$0.20	$0.22
Butac	lb.	.085 /	.105
Collocarb (Dispersed Wyex)	lb.	.06 /	.07
Cosol No. 1	gal.	.26 /	.34
2	gal.	.25 /	.33
3	gal.	.22 /	.30
Cumar EX	lb.	.0525	
MH	lb.	.065 /	.1175
V	lb.	.095 /	.1275
Dibenzyl Phthalate	lb.	.51 /	.59
Dibutyl Sebacate	lb.	.48 /	.565
465 Resin	lb.	.035	
"G" Resin	lb.	.08	
Hydratex R	ton	20.00	
IMH	lb.	.65 /	.67
Nevindene	lb.	.105 /	.135
No. 1-D Heavy Oil	lb.	.04	
Nuba resinous pitch, Grades No. 1 and No. 2	lb.	.029	
Paragon	ton	10.00	
Paraplex G-25, 100%	lb.	.75	
Plasticizer 35	lb.	.205 /	.24
36	lb.	.305 /	.34
SRA No. 2	lb.	.53 /	.55
Suprex	lb.	11.00 /	23.50
Tamol R	lb.	.16 /	.25
Tollac	gal.	.28 /	.33
Tritons	gal.	.15 /	.37
Turgum S	lb.	.0675	

SCRAP RUBBER

DEMAND for scrap rubber in May continued at April's brisk rate, notwithstanding a less active demand for reclaim due to the permitted use of GR-S in camelback. The inadequate trade supply continued to be augmented by releases from the government stockpile, which is not expected to be exhausted for a considerable period. Only a small amount of synthetic scrap is noted in trade collections, and this includes a few synthetic retreads.

Scrap Rubber Ceilings

	¢ per Lb.
Inner Tubes†	
No. 2 passenger tubes	7¾
Red passenger tubes	7½
Passenger tubes	6

	$ per Short Ton
Tires‡	
Mixed passenger tires	20.00
Beadless passenger tires	26.00
Solid tires	36.00
Peelings†	
No. 1 peelings	47.50
No. 2 peelings	47.50
No. 1 light colored (zinc) carcass	52.50
Miscellaneous Items#	
Air brake hose	25.00
Miscellaneous hose	17.00
Rubber boots and shoes	33.00
Black mechanical scrap above 1.15 sp. gr.	20.00
General household and industrial scrap	15.00

† All consuming centers except Los Angeles.
‡ Akron only.
# All consuming centers.

Fixed Government Prices*

Balata	Price per Pound: Civilian Use	Price per Pound: Other Than Civilian Use
Manaos Block	$0.38¾	$0.38¾
Swinam Sheet	.42½	.42½
Guayule		
Guayule (*carload lots*)	.17½	31
Latex		
Normal (*tank car lots*)	.26	.43½
Creamed (*tank car lots*)	.26¾	.44¼
Centrifuged (*tank car lots*)	.27¾	.45¼
Heat-Concentrated (*carload drums*)	.29½	47
Plantation Grades		
No. 1X Ribbed Smoked Sheets	.22½	.40
1X Thin Pale Latex Crepe	.22½	.40
2 Thick Pale Latex Crepe	.22	.39½
1X Brown Crepe	.21⅜	.38⅞
2X Brown Crepe	.21⅛	.38⅝
2 Remilled Blankets (Amber)	.21¼	.38¾
3 Remilled Blankets (Amber)	.21⅛	.38⅝
Rolled Brown	.18	35½
Synthetic Rubber		
GR-M (Neoprene GN)	.27½	45
GR-S (Buna S)	.18½	.36
GR-I (Butyl)	.15½	33
Wild Rubber		
Upriver Coarse (crude)	.12⅝	26⅛
(washed and dried)	.20¼	.37¾
Islands Fine (crude)	.14⅝	.28¼
(washed and dried)	.22½	.40
Caucho Ball (crude)	.11⅝	.24¾
(washed and dried)	.19¼	.37
Mangabiera (crude)	.08½	.19¾
(washed and dried)	.18	.35½

*For a complete list of all grades of all rubbers, including crude, balata, guayule, synthetic, and latex, see Rubber Reserve Co. Circular 17, p. 169, May, 1943, issue.

THE FIFTH WAR LOAN (JUNE 12-JULY 8) is the most vitally important financial effort of the war.

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Continued

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FOR SALE: 1—Watson-Stillman Hydro-Pneumatic Accumulator, 5½" ram, 48" stroke, 3000# pressure; 1—24x24" Hydraulic Press, 100 to 150 tons; 1—15x18" Hydraulic Press, 200-Ton, Hobing Press; 1—18x38" Farrel-Birmingham 3-roll Calender; 1—16x42" Calender, 3-roll, with drive and motor; 1—20x60" 3-roll Calender, herringbone drive; 1—Allen #3 Tuber; W. & P. Mixers; Dry Mixers; Pulverizers; Grinders, etc. Send for complete list. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York 7, N. Y.

"V" BELT MACHINERY
COMPLETE BELT-MAKING EQUIPMENT
Building Machines, Cutters, Slitters, Wrappers, Measuring Machines, Trimmers, Expanding Mandrels, Cord Latexers, and Driers. HOWE MACHINERY CO., INC., 30 Gregory Avenue, Passaic, N. J.

FOR SALE: 2—42" MILLS, COMPLETE UNIT WITH REDUCTION drive and 100 Horse Power motor, good operating condition. Address Box No. 850, care of INDIA RUBBER WORLD.

1—4-ROLL WASHER; 2—2-ROLL WASHERS; 1—36" MILL; 2—40" mills; 2—60" Calenders; 1—#2 Royle Tubing Machine; 1—#4 Royle Tubing Machine; 1—Adamson Tubing Machine, 6" worm; 1—Allen Tubing Machine, 5" worm; 4—Rubber Spreaders; 10—Upright Rubber Churns; 2—40-gallon Pony Mixers; 1—72" Doubling Calender; 2—Sets of Cans for Combining; 1—Broughton Mixer; 1—Large Hammer Mill; 1—Span Grinder; 1—Experimental Mill; 1—4-roll Calender 8x18. Address Box No. 857, care of INDIA RUBBER WORLD.

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WANT TO BUY SMALL RUBBER PLANT MANUfacturing patented articles. New York or New England area. Address Box No. 837, care of INDIA RUBBER WORLD.

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Important group wants to buy rubber factory, preferably with presses for soles, heels and slabs, for manufacture of vulcanized shoes. Factory should be ready to run or easy to be put in operation, and should possess basic equipment (mills, calenders, vulcanizers, tubers, etc.). Would also consider factory equipped for other rubber articles. Deal to be concluded rapidly. Address Box No. 859, care of INDIA RUBBER WORLD.

MISCELLANEOUS

WANTED FOR NAVY CONTRACTS: SEMI-CURED RUBBER tubes, 2-$^{7}/_{16}$″ I.D., 0.060″ Wall, in 51-ft. lengths for cotton rubber-lined fire hose to meet Federal Specification E-ZZ-H-451a. Address Box No. 844, care of INDIA RUBBER WORLD.

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Splitting tires into their component parts is the task of the men and machines shown here in Schulman's plant. This process gets the largest rubber content from each tire, separates the various grades, and insures maximum wartime use of all reclaiming equipment. Synthetic is kept separate from natural rubber all along the line. Speed and accuracy in the splitting operation is part of our all-out effort to serve you well.

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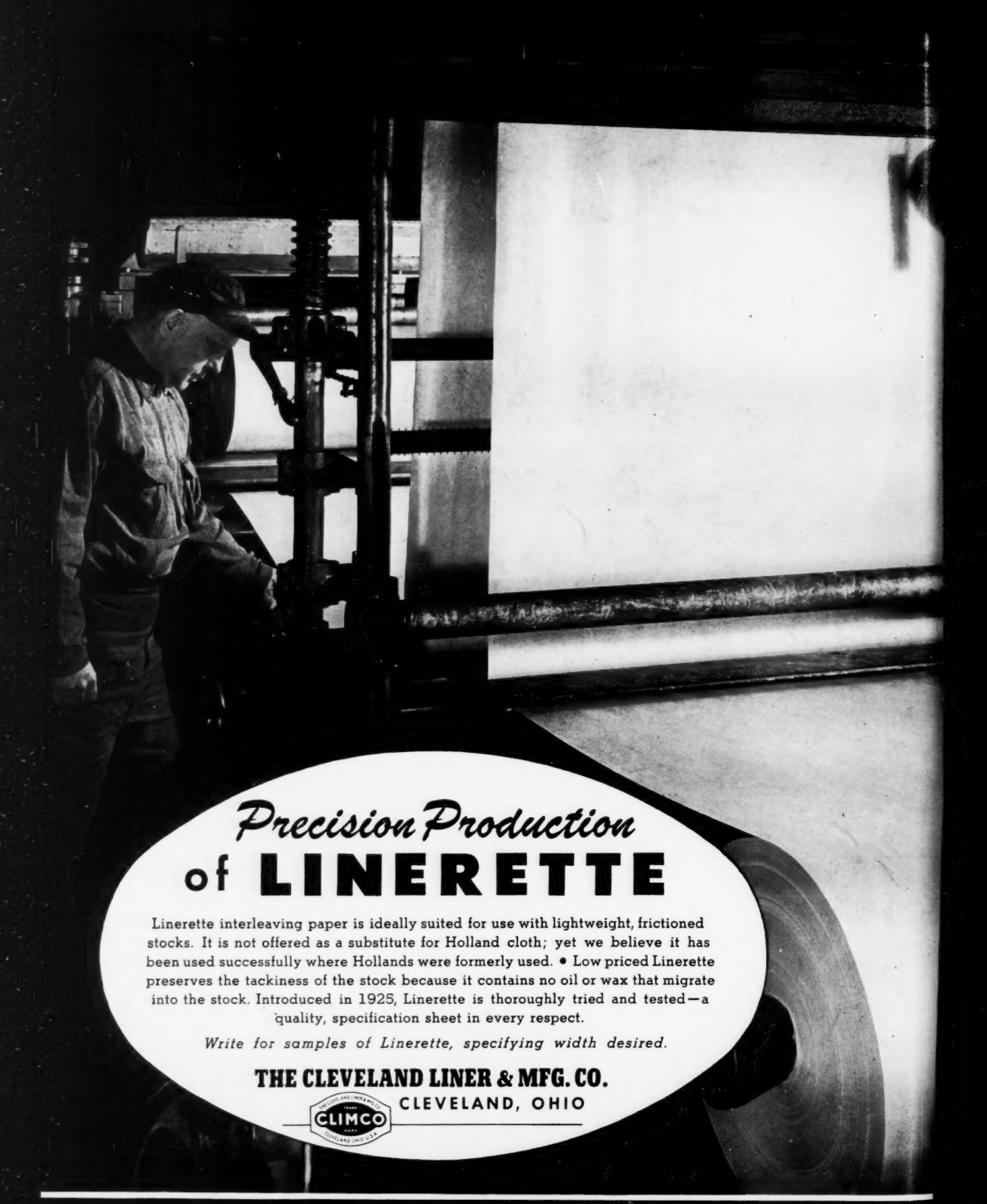

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